STUDY OF AIRPOWER

UNIVERSITY
OF MICHIGAN

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READING ROOM

HEARINGS

BEFORE THE

SUBCOMMITTEE ON THE AIR FORCE

OF THE

COMMITTEE ON ARMED SERVICES

UNITED STATES SENATE

EIGHTY-FOURTH CONGRESS

SECOND SESSION

AIRPOWER

MAY 23, 31, AND JUNE 1, 1956

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Rear Adm. James S. Russell, Chief, Bureau of Aeronautics, Department of the Navy;

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Capt. Forsyth Massey, Head, Air Weapons System, Analysis Staff, Office of DCNO (Air);

Capt. Edward C. Outlaw, Assistant for Atomic Matters, Air Warfare Division, CNO;

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Comdr. James S. Elkins, Head, Anti-Submarine Warfare Unit, CNO;

Comdr. Robert E. Warner, Assistant, Airborne Defense Weapons, Air Warfare Division, CNO;

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NOTE.—Throughout the text, topic headings have been inserted to facilitate reference. These topic headings are not part of the testimony per se.

STUDY OF AIRPOWER

WEDNESDAY, MAY 23, 1956

AFTERNOON SESSION

Present: Senators Symington (presiding) and Duff.

Also present: Fowler Hamilton, General Counsel; Ramsay D. Potts, Jr., Associate General Counsel; Fred B. Rhodes, legal consultant to Senator Saltonstall; Edward C. Welsh, assistant to Senator Symington; Ronald Friedenberg and Wallace L. Engle, staff members; Rear Adm. Charles D. Griffin, Director, Long-Range Objectives Group, Office, Chief of Naval Operations; Capt. S. S. Searcy, Jr., USN, Office, Chief of Naval Operations; Lt. Cmdr. C. C. Buck, Office of Guided Missiles, Office, Chief of Naval Operations; Lt. Col. Donald S. Bussey, ODCSOPS, Department of the Army; Clarke A. Morgan, OSD, Security Office; Bernard S. Bogdanowicz, OSD, Security Office.

[The closed session testimony was censored by the Department of Defense for security reasons.

Those portions of the record affected by this censorship are indicated by the symbol Ⓓ.]

Senator SYMINGTON. This hearing of the Subcommittee on the Air Force of the Senate Armed Services Committee will now come to order.

Mr. Counsel, what is the program for this afternoon?

Mr. HAMILTON. Mr. Chairman, Admiral Clark, who is Director of the Guided Missiles Division of the Navy, is here and prepared to give the committee a briefing upon the Navy present and prospective positions in the guided-missiles field.

He has a prepared statement, a copy of which has just been laid before each of us, and I wonder if it is agreeable with the committee that he initiate the hearing by reading that statement.

Senator SYMINGTON. Admiral, we welcome you with us and look forward to what you have to say. At this point I would like to insert in the record a résumé of your distinguished career.

REAR ADMIRAL JOHN E. CLARK, UNITED STATES NAVY

John Edward Clark was born near Atchison, Kans., on August 13, 1905, son of Lon C. and Agnes (Benner) Clark. He attended Leavenworth (Kans.) grade and high schools prior to his appointment to the United States Naval Academy, Annapolis, Md., from his native State in 1923. Graduated and commissioned ensign on June 2, 1927, he subsequently progressed in rank, attaining that of rear admiral to date from August 1, 1955.

Following graduation from the Naval Academy in 1927, he remained there for the summer course in aviation. In August he reported on board the U. S. S. *Milwaukee*, and in August 1928 transferred to the U. S. S. *Pittsburgh*, both operating on Asiatic Station. Detached from the latter in July 1931, he was ordered to the Naval Sir Station, Pensacola, Fla., for flight training. Designated naval aviator on September 28, 1932, the next month he joined Fighting Squadron 3B, attached to the U. S. S. *Langley*.

Between June 1935 and July 1937 he was assigned to the Naval Air Station, Naval Operating Base, Norfolk, Va., after which he had duty at the Naval Aircraft Factory, Navy Yard, Philadelphia, Pa. He remained there until June 1938, when he joined Torpedo Squadron 3, based on the U. S. S. *Saratoga*. On June 10, 1941 he assumed command of that squadron, continuing to command it, following the United States' entry into World War II, December 8, 1941, until April 1942. He next served as gunnery officer on the staff of Commander Carrier Division 1, U. S. S. *Lexington*, flagship.

"For outstanding performance of duty * * * as aircraft gunnery officer on the staff of the air task group commander in preparation for, during, and after the successful engagements with the enemy in the Coral Sea, on May 7–8, 1942 * * *," he received a letter of commendation, with authorization to wear the Commendation Ribbon, from the Commander in Chief, United States Pacific Fleet. The citation continues in part:

"With his very extensive experience in aircraft gunnery and particularly his thorough knowledge of aircraft torpedo tactics, he was of great assistance to the task group commander * * * and contributed materially to the success of our forces in the battle."

In August 1942 he reported as gunnery officer on the staff of Commander Air Force, United States Pacific Fleet. He was awarded the Legion of Merit for "exceptionally meritorious conduct * * * as force gunnery and training officer on the staff of Commander Air Force, Pacific Fleet, from August 1942 to June 1943 * * *." The citation further states in part:

"Serving with distinction during this period he directed the establishment of a multitude of activities and facilities for training the flying and nonflying personnel of all air, surface, and ground units assigned to the aeronautical organization within the Pacific Fleet, thereby contributing materially to the success of these forces in maintaining superiority over the enemy. In addition, he planned and directed the allocation of all aviation munitions and rendered invaluable service in matters pertaining to aviation ordnance and ship antiaircraft gunnery * * *."

From July 1943 until January 1945 he was assigned to the aircraft armament unit at the Naval Air Station, Patuxent River, Md., followed by successive instruction at the Army Air Force School of Applied Tactics, Orlando, Fla.; Command and General Staff School, Fort Leavenworth Kans.; Naval War College, Newport, R. I.; and the Army-Navy Staff College, Washington, D. C. In July 1945 he reported as aviation officer on the staff of the Commander Philippine Sea Frontier, and 4 months later (November 1945) assumed command of the U. S. S. *Currituck* (AV 7).

In July 1947 he reported as Chief of the Air Objectives Section Office of the Deputy Chief of Naval Operations (Air), Navy Department, Washington, D. C. He remained there until August 1949 and following instruction which lasted until June 1950 at the Industrial College of the Armed Forces, Washington, D. C., joined the staff of the Commander in Chief, United States Pacific Fleet. He had duty in connection with guided missiles in the Office of the Secretary of Defense Washington, D. C., from April 1952 until July 1953 when he assumed command of the U. S. S. *Wright*. Detached from command of that aircraft carrier in September 1954, he returned to the United States, and in October became Commander, Navy Guided Missile Test Center, Point Mugu, Calif. On November 18, 1955, he was assigned duty as Director of the Guided Missiles Division, Office of the Chief of Naval Operations, Navy Department.

In addition to the Legion of Merit and Commendation Ribbon, Rear Admiral Clark has the American Defense Service Medal Fleet Clasp; Asiatic-Pacific Campaign Medal; the American Campaign Medal, the World War II Victory Medal; the Navy Occupation Service Medal, Asia Clasp; National Defense Service Medal; and the Philippine Liberation Ribbon. He has also been awarded the Order of the British Empire (Honorary Officer), from the Government of Great Britain.

His official home address is 820 East Laura, Pensacola, Fla. He is married to the former Amelia Largue, of Pensacola, Fla., and they have one son, Jack Largue Clark.

Senator SYMINGTON. Would you like to complete your briefing before questions?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. Are you going to have any other witnesses testify besides yourself?

Admiral CLARK. Mr. Chairman, I have representatives of the Bureau of Aeronautics, Bureau of Ordnance, and Special Projects, that I would like to have sworn.

Senator SYMINGTON. Gentlemen, will you all raise your right hands and be sworn.

Do you solemnly swear that before this Subcommittee on the Air Force of the Senate Armed Services Committee, you will tell the truth, the whole truth, and nothing but the truth, so help you God?

Admiral CLARK. I do.

Commander BUNDY. I do.

Colonel GALER. I do.

Commander MAXWELL. I do.

Commander ANDERSON. I do.

Senator SYMINGTON. Proceed, Admiral.

TESTIMONY OF REAR ADM. JOHN E. CLARK, USN, DIRECTOR, GUIDED MISSILES DIVISION, OFFICE OF CHIEF OF NAVAL OPERATIONS; ACCOMPANIED BY COMDR. C. W. BUNDY, USN, BUREAU OF ORDNANCE, DEPARTMENT OF THE NAVY; COL. R. E. GALER, USMC, BUREAU OF AERONAUTICS, DEPARTMENT OF THE NAVY; COMDR. F. W. MAXWELL, USN, BUREAU OF AERONAUTICS, DEPARTMENT OF THE NAVY; AND COMDR. R. G. ANDERSON, USN, SPECIAL PROJECTS, BUREAU OF ORDNANCE, DEPARTMENT OF THE NAVY

Admiral CLARK. By way of introduction, Mr. Chairman, I would like to say that the Navy guided missile program objective addresses itself in the most basic sense, to two fundamental requirements: first, to provide a fleet air defense capability adequate to support naval operations in the face of strong enemy air opposition; and, second, to provide our air, surface and submarine striking forces with an attack capability employable in the face of strong enemy defenses against present delivery techniques.

PRESENT TECHNIQUES OUTMODED

These requirements stem from two simple realities:

A. The gun is fast becoming obsolete as an effective air defense weapon.

B. In time any competent enemy can be expected to develop defenses that will render present attack techniques extremely difficult and costly.

MISSILES BEING DEVELOPED

A decade of heavy expenditure and development effort has gone into the creation of our guided-missile potential. That potential is now in hand. It offers the best known approach to our two basic requirements.

Yet we are maintaining a realistic attitude with regard to missiles—as we know or envision them today. We admit that they are far from perfect. Important in this category are the questions of electronic jamming, and the possible future altitude and speed capabilities of targets with which defensive missiles must contend.

In addition, it must be appreciated that medium- and long-range attack missiles, to be economically acceptable, must carry nuclear warheads. Their utility, therefore, is limited to nuclear wars or as deterrents against the occurrence of such wars.

MISSILIZATION OF OPERATING FORCES JUST STARTED

The Navy is converting its guided-missile potential into a functioning fleet capability. For we appreciate that the missiles per se represent no capability whatsoever. The capability lies only in the operating forces—the ships, submarines, and aircraft—configured and trained to employ the missiles.

The missilization of the operating forces has just begun. Over the course of the next 4 to 5 years we can expect to see the Navy respectably missilized, both offensively and defensively. The operating forces during this period will serve a significant role in perfecting the weapons and optimizing employment techniques.

With these thoughts in mind, and to indicate to you what the Navy's missile potential is, I shall proceed to cover briefly the various projects.

AIR DEFENSE IS VITAL

As previously noted, the first basic requirement is air defense. This requirement is vital, no matter what the forces defended and no matter what enemy attack weapons are involved, be they conventional or thermonuclear.

Within the air defense requirement there are two categories of missiles, namely:

A. Surface-to-air: Employable from either ship or land-launching system.

B. Air-to-air: Employable from either carrier or land-based fighter aircraft.

SURFACE-TO-AIR MISSILE PROJECTS

In the surface-to-air category the Navy has three projects: TERRIER, TALOS and TARTAR, which are somewhat related in their basic operational techniques, but which are markedly different in size and performance characteristics. These projects primarily support the fleet air defense requirement. The missiles, however, are adaptable to land-based employment.

TERRIER

A United States Marine Corps mobile TERRIER system has been developed. One Marine battalion is already in service. A second will be activated next fiscal year.

The Air Force has recently chosen the Navy TALOS to assist in the defense of important SAC bases. (D)

Let us look first at TERRIER.

TERRIER is launched with an auxiliary solid-rocket booster which drops off after the missile reaches a certain speed. Thereafter propulsion is provided by an integral solid-rocket sustainer.(D)

Terrier has completed a service evaluation. The first Terrier

TERRIER has completed a service valuation. The first TERRIER, ship the USS *BOSTON*, has jointed the fleet. Her sistership, the *CANBERRA*, will be commissioned in June.

The next of our surface-to-air missiles to be operational is TALOS.

TALOS

Senator SYMINGTON. We are interested in this missile. Any further description you could give, any detail would be appreciated. This is the first time I have had a briefing on it.

I remember previous briefings on NIKE, but not TALOS.

Would you be willing for Senator Duff and myself to ask questions on this missile while you have it on the screen?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. Thank you. You go ahead. (D)

Admiral CLARK. The first TALOS ship is a part of the fiscal year 1956 shipbuilding and conversion program and should be ready for service in fiscal year 1958.

Senator SYMINGTON. Is that all that you have on this missile?

Admiral CLARK. That is all that I had planned in a formal statement.

Senator SYMINGTON. Technical direction; what does that mean?

Admiral CLARK. That is the Johns Hopkins University, the Applied Physics Laboratory. This missile was conceived by them. The first laboratory models were built by them. The missile is presently being built by Bendix. (D)

Senator SYMINGTON. Now, let me ask a couple of questions for the record. (D)

NIKE COMPARED WITH TALOS

During the war, wasn't one of your problems when, say, a carrier was attacked, the quantity of planes? Your problem was to deal with all the planes at one time, was it not?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. And that would be true, would it not, of a city, too, if hundreds of planes attacked a city?

Admiral CLARK. Yes, sir. There would be many planes to be taken under attack.

Senator SYMINGTON. We put a thousand B–17's over Berlin. NIKE could only track, I believe, 24 in either the city of New York or Washington. That wouldn't seem enough, from the standpoint of planes getting through; even if only a much fewer number than 976 got through, out of a thousand.

Now, the warhead would be comparable in effect in both cases, would it not?

Admiral CLARK. That's right; yes, sir. It would be the same warhead.

Senator SYMINGTON. And what is the fuel of the NIKE? (D)

Admiral CLARK. The NIKE is nitric acid and aniline.

Senator SYMINGTON. Is there any advantage or disadvantage in your position over theirs?

Admiral CLARK. I don't think so, sir. The reason we don't like acid, of course, is because it is not a good shipmate. We don't like

to have it aboard ship, but I think that for speed and range, they are probably comparable. (D)

Senator SYMINGTON. Now, weight; the combined weight of your missile. What is the weight of NIKE? Have you any figures that you know of offhand? (D)

Admiral CLARK. No, sir, I haven't, but they are comparable. Both missiles require a booster.

Senator SYMINGTON. And NIKE is bigger than the TALOS, isn't it, or is it?

Admiral CLARK. I don't believe so.

Senator SYMINGTON. How about diameter?

Admiral CLARK. Here again, they are comparable, sir, and I am talking about the NIKE B, sir.

Senator SYMINGTON. Now, about cost. For every TALOS you shoot, you can track a plane; isn't that right?

Admiral CLARK. Yes.

Senator SYMINGTON. You have to have three instruments, don't you, with NIKE?

Admiral CLARK. Two, sir.

Senator SYMINGTON. So TALOS is less expensive?

Admiral CLARK. Well, that is not entirely true; no sir. TALOS itself is a more expensive missile.

Senator SYMINGTON. Has there been any comparison?

Admiral CLARK. Of total cost, installation cost?

Senator SYMINGTON. You say that TALOS is more expensive than NIKE. What are the figures you have in mind for both?

Admiral CLARK. The TALOS missile at the present time is about $200,000, and NIKE I is about $30,000.

Senator SYMINGTON. Is that because of a high learning curve on low production? After you have made 500 NIKES and 500 TALOSES, would that relative difference stay there?

Admiral CLARK. I think that TALOS would still be a great deal more expensive, but not in this particular band. The reason for that, Mr. Chairman, is that with a missile aboard ship, we have to have a rapid reloading sequence.

We can't have missiles in numbers across the landscape. This requires a complex missile and a very reliable missile. (D)

Senator SYMINGTON. I am trying to get enough facts on the table so the committee can form its opinion.

So the fact that it is planned for a ship and the fact that it has to be, would you say, more reliable——

Admiral CLARK. Rugged and reliable. (D)

Senator SYMINGTON. What is the system that the NIKE has?

Admiral CLARK. It is simply a nitric acid rocket. (D)

Senator SYMINGTON. And then you feel that the range itself increases the cost?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. Senator Duff, any questions?

Senator DUFF. No, sir.

Senator SYMINGTON. Mr. Counsel?

Mr. HAMILTON. No, thank you.

Senator SYMINGTON. Admiral, I think that gives us a good picture.

One other point: Talking about range, how about altitude? You haven't got that on the chart. You have in the picture.

Admiral CLARK. Yes, sir. I will give the precise figures in classified form. We plan to increase this figure in a few years. (D)

Senator SYMINGTON. What is NIKE now?

Admiral CLARK. It will be the same.

Senator SYMINGTON. The same altitude?

Admiral CLARK. Yes, sir; they will have the same altitude.

Senator SYMINGTON. Will you go ahead.

TARTAR

Admiral CLARK. The third member of this team is the newest and smallest—the TARTAR.

TARTAR is a blood-brother of the improved TERRIER and may be simply defined as a TERRIER without a booster. It is designed for use from ships as small as destroyers and for secondary battery use from larger ships. (D)

The first application of TARTAR will be in the destroyer types included in the fiscal year 1957 shipbuilding and conversion programs.

SURFACE-TO-AIR MISSILE PROGRAMS

This slide displays the planned and expected availability of surface-to-air missile ships through the shipbuilding and conversion program during the next 5 years.

Note:

1. The TALOS ships listed are cruisers.
2. The TERRIER ships are cruisers and large destroyers.
3. The TARTAR appears on the slide only as the armament of destroyers but it is also intended as the secondary battery of TALOS and TERRIER new construction cruisers.
4. The guided missile ships indicated on the chart will provide in 1961 a reasonably adequate air defense for three task groups.

Mr. HAMILTON. Pardon me just a moment, Admiral. It might save time, unless you can supply us with copies of the charts for the record, if you would read the statistics into the record. If you can supply us with copies of the charts, I think that would be adequate for our purpose.

Admiral CLARK. Very well.

Senator SYMINGTON. I did not quite hear what you said.

Mr. HAMILTON. The point I was making, Mr. Chairman, is this: The question was how to get on the record these statistics and facts that are in the chart.

Admiral Clark said that he would be willing to handle it by supplying copies of the charts for the record. Otherwise, I would suggest that he read the data on the charts into the record.

Senator SYMINGTON. I would like to see him do that. It will make the charts a lot clearer for the record.

Admiral CLARK. Very well, sir.

For the TALOS missile we have a light cruiser conversion, the CGL, 1 in 1958, 2 in 1959, 2 in 1960, and 2 in 1961, for a total of 7.

Mr. HAMILTON. Your reference to the dates is to fiscal rather than calendar years; is that correct?

Admiral CLARK. That is correct. (D)

In the TERRIER missiles, the CAG is a heavy cruiser guided missile, 2 in 1956, for a total of 2 by fiscal year 1961.

The DDG's, destroyer with guided missile, 1 conversion in 1957. The CLG is again a light cruiser with guided missile, 1 in 1959, 3 in 1960, 3 in 1961, for a total of 7.

The DLG is a destroyer leader or frigate, an oversized destroyer with guided missile, 6 in 1960, 6 in 1961, for a total of 12.

The TARTAR for the guided missile destroyer, 8 in 1960 and 9 in 1961, for a total of 17.

The cumulative total by missile, TALOS ships, 1 in 1958, 3 in 1959, 5 in 1960, 8 in 1961.

For TERRIER, 2 in 1956, 3 in 1957, 3 in 1958, 4 in 1959, 13 in 1960, and 22 in 1961.

TARTAR ships, 8 in 1960 and 17 in 1961.

Mr. HAMILTON. And Admiral, for the completion of the record, what would be the composition of the three attack carrier striking groups you mentioned on the chart?

Admiral CLARK. It would be the nucleus; the nucleus is always carriers, 2 or 3.

Mr. HAMILTON. Two or three carriers?

Admiral CLARK. Yes, sir; and then this total would be divided into three, and that number would go to each of the task groups.

ATTACK CARRIERS

Senator SYMINGTON. Let me be sure I am clear on that. You have a carrier striking group. You have in that either 2 or 3 carriers?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. And what type of carrier are those?

Admiral CLARK. The attack carrier, the large carrier.

Senator SYMINGTON. Is the attack carrier the *Forrestal*-type carrier?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. Is there any other carrier that is not a *Forrestal*-type that is an attack carrier?

Admiral CLARK. Yes, sir. The *Essex* class, the converted World War II carriers, Mr. Chairman.

Senator SYMINGTON. How many of those did you convert?

Admiral CLARK. I don't have that figure.

Senator SYMINGTON. Furnish that figure for the record, will you?

Admiral CLARK. Yes, sir.

(The data requested have been supplied to the committee in classified form.)

Senator SYMINGTON. That *Essex*-type and the *Forrestal*-type are both attack carriers, is that right?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. Are there any other carriers that you can call attack carriers?

Admiral CLARK. Well, yes, sir, the *Franklin D. Roosevelt*-type. There are three of those.

Senator SYMINGTON. What is the difference between that and the *Essex*?

Admiral CLARK. They come between the *Essex* and the *Forrestal* but they also were built in World War II.

Senator SYMINGTON. Are there any others besides those three?

Admiral CLARK. No, sir, not for attack carriers.

Senator SYMINGTON. What is the tonnage of each, roughly?

Admiral CLARK. The *Essex* class, about twenty-seven to thirty thousand; the *Roosevelt* class, approximately, thirty-five to forty or forty-five thousand and the *Forrestal*, sixty.

FORTY-SEVEN MISSILE SUPPORT SHIPS

Senator SYMINGTON. And then you will have available 3 TALOS ships, 7 TERRIER ships, 6 TARTAR ships. Are they carrier or supporting ships?

Admiral CLARK. Those are all supporting ships. They will be the crusiers, destroyers, destroyer leaders.

Senator SYMINGTON. And where do we get the figure of 16 at the bottom out of the figures at the top? Where does that 16 come from?

In other words, your total there is 47. It would be 47 cumulative, too, adding 17, 20, and 8, but you only show 16 at the bottom. What happens to the other 47?

Admiral CLARK. That is 16 ships to each group, so, 3 times 16.

Senator SYMINGTON. I see. That would be 48.

Admiral CLARK. Yes, sir.

Senator SYMINGTON. We lose one in the rush.

Admiral CLARK. One task force would be one ship short.

Mr. HAMILTON. Then you would have in each group, in addition to the 16 ships, 2 or 3 carriers. Is that correct?

Admiral CLARK. That is correct. The composition of a task group in time of war depends on two things: The mission that you intend to perform, and the ships that happen to be available at the moment.

You might make up a task group of 2, 3, or 4 carriers. You compose the task group according to the needs of the moment.

Mr. HAMILTON. These are really your resources, so to speak, as far as the missile ships are concerned?

Admiral CLARK. Yes, sir.

Mr. HAMILTON. And an illustration of one representative way of deploying them in terms of attack carrier task force.

Admiral CLARK. That's correct.

Senator SYMINGTON. You are going to have 47 by fiscal year 1961, or through fiscal year 1961?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. You say that these are valuable additions to the defense of a fleet?

Admiral CLARK. Yes, sir.

We feel, as I said before, the gun is rapidly becoming useless as an antiaircraft defense weapon.

Senator SYMINGTON. Guns are rapidly becoming useless as antiaircraft defense, right?

Admiral CLARK. Because of their short range.

MISSILE SHIPS BEING CONVERTED

Senator SYMINGTON. Are you building new ships to take these missiles, or are you converting over?

Admiral CLARK. At the present time, most of our ships are conversions. We have plans for new construction.

Senator SYMINGTON. On the basis of that chart, which ones are conversions and which ones are new?

Admiral CLARK. I will supply that.

Senator SYMINGTON. Will you furnish that for the record?

Admiral CLARK. Yes, sir.

(The data requested have been supplied to the committee in classified form.)

Senator SYMINGTON. My final question, to understand the chart, if it is as important as you say, and I do not doubt it, why don't we go ahead and build them faster?

Admiral CLARK. Well, I think the answer to this will have to come from Admiral Burke, Mr. Chairman. In the ship-building and conversion program, they get into that.

Senator SYMINGTON. I will have some questions for him, but I am asking you.

Admiral CLARK. We are keeping pace with the research and development; that is another reason, sir.

LIMITED FUNDS DELAY MISSILIZATION OF FLEET

Senator SYMINGTON. Let me be more specific. Is it a limitation of funds, or is it your belief that it is not necessary—are you being held down by funds, or what is it?

Admiral CLARK. I think that this will keep us with a balanced fleet as regards air defense, in line with the number of carriers that we will have, and the task groups that we will be able to support.

Senator SYMINGTON. So even though you had unlimited funds, you would not want to build the missile ships any faster than you have shown us?

Admiral CLARK. If I had unlimited funds, I would build them very much faster, Mr. Chairman.

Senator SYMINGTON. You would build them very much faster?

Admiral Clark. If I had unlimited funds, yes, sir.

Senator SYMINGTON. Then the reason you are not doing it is that you have limited funds; is that right?

Admiral CLARK. Well, I think that is probably true, if anything; yes, sir. (Discussion off the record.)

Senator SYMINGTON. For the future security of the United States, it is vital we have a supreme Navy.

If you say, as you did, that guns were about obsolete, we in turn ask why you don't build the ships quicker. If it is because of lack of funds, tell us that it is because of lack of funds.

What is the reason that you don't replace an obsolete ship—which, in effect, is what you call this ship—with a modern ship?

Admiral CLARK. Well, it isn't entirely that, Mr. Chairman.

Senator SYMINGTON. You go ahead then and clear it up, because we want to be fair, and the record accurate.

Admiral CLARK. We say that guns are rapidly becoming obsolete as air defense weapons. We still need guns and will for surface-to-surface protection.

We will need guns for some years to come for low altitude aircraft protection. For the high altitude, large aircraft, we feel that the guided missile must do the job. We are intentionally making this conversion gradually for that reason. This is a transition period, and we think it is wise to take it in gradual steps.

Senator SYMINGTON. I don't want to labor it, but if you are doing this intentionally, would you do it much faster if you had unlimited funds?

Admiral CLARK. I think if we had unlimited funds, Mr. Chairman, we probably would build more Forrestals, and this would require more guided missile ships to protect them.

Senator SYMINGTON. In other words, you would build more carriers that would require these ships, right?

Admiral CLARK. I think that is right; yes, sir.

Senator SYMINGTON. Senator Duff?

Senator DUFF. No questions.

Senator SYMINGTON. Mr. Counsel?

Mr. HAMILTON. I have nothing, sir.

DEFENSE IN DEPTH

Admiral CLARK. This next slide shows the place of the surface-to-air missiles in the perspective of the task group air defense problem. It should be noted that ours is a problem of defense in depth—not protection by a single defensive line or of a point or single ship. Task group air defense means detection, identification, classification, control, coordination and destruction of targets in an air volume overlying a huge plane area. (D)

ONE TASK GROUP AREA LARGER THAN TEXAS

As you can see, air defense of a single task group involves a huge area—bigger than the State of Texas. This gives some measure of the dispersability of naval forces.

It should be noted that a significant part in the defense in depth is played by interceptor aircraft. The air-to-air missile is the armament for such aircraft. (D)

Senator SYMINGTON. For my own information along those lines. Assume you have three carriers in a task force, I know there is some rule. (D)

How do you handle the ships that are in the air? For example the periphery of Texas and the ships that are there, what percentage go up, and how do you handle that, and the refueling situation?

Admiral CLARK. Do I understand you mean communications?

COMPOSITION OF CARRIER AIRCRAFT

Senator SYMINGTON. No. Say you have 300 airplanes and 3 carriers. What percentage of the airplanes are up and what percentage are down? Is there any rule of thumb on that?

Admiral CLARK. This varies, Mr. Chairman. Ordinarily, we will carry 3 interceptor squadrons and 1 attack squadron in the——

Senator SYMINGTON. Is the attack squadron a bomber squadron?

Admiral CLARK. That is a bomber squadron.

Senator SYMINGTON. Interceptor squadrons are fighter squadrons?

Admiral CLARK. That is correct. This also can be varied and the composition of the group that goes aboard the carrier can be varied, again depending upon the area in which you expect to operate.

It may be that you need more fighter protection, and it may be that you don't, and you can carry more attack aircraft. The number of

aircraft that are placed upon the periphery again would be a matter of the area you are in and the direction from which you might anticipate an attack.

Mr. HAMILTON. Mr. Chairman, may I ask one question for the amplification of the record with respect to that chart? It is this, Admiral:

ARRANGEMENT OF CARRIER TASK FORCE

Could you tell us what defines the three circles that you have there, the red, the green, and the yellow, from the standpoint of what components, in terms of vessels in the task force, you would expect to find within each of the three circles?

Admiral CLARK. Those circles indicate the range of the missiles.

Mr. HAMILTON. So I understood, but I wondered what elements of your task force——

Admiral CLARK. The carriers would be in the center. (D)

This slide shows the great increase in attack envelopes which the missiles give to the fighter. Guns must be fired from very close range and at small angles off the tail.

That is the small pink area.

Senator SYMINGTON. The small pink area? What small pink area?

Admiral CLARK. The small pink area just at the tail of the airplane, the small wedged shape.

Rockets give some improvement but they still require precise fighter positioning—and this is by no means easy at the speeds and altitudes of air combat today.

That is the pink area that is half-moon shaped and which includes the gun area. This is the area from which we can fire rockets in an attack. They still require precise fighter positioning, and this is by no means easy at the speeds and altitudes of air combat today.

In contrast, the air-to-air missile can kill from considerable firing ranges and angles as shown here. (D)

AIR-TO-AIR MISSILES

Senator SYMINGTON. Are we going into air-to-air now?

Admiral CLARK. Yes, sir; we are in the air-to-air area. The gray area all the way around is the area that we can use with all-weather guided missiles. (D)

Here are the plans for full fleet introduction of these missiles. This chart is a rather involved one. I think it can be done better, but I haven't been able to work it out yet.

The total number of squadrons is along the bottom, the broken lines are calendar years. The numbers on the steps are the numbers of squadrons that will be in service compared to the calendar year at the bottom.

Within each block is the type aircraft involved and what the missile will be.

Mr. HAMILTON. How many planes are in a squadron, or does that vary?

Admiral CLARK. This varies. Fourteen to twenty.

Mr. HAMILTON. Fourteen to twenty depending upon the type of aircraft?

Admiral CLARK. The type of aircraft, the employment at the time. We usually try to keep about 20.

Mr. HAMILTON. About 20?

Admiral CLARK. Yes. As you can see, a very large program is underway.

Soon most of our day-fighter squadrons and some of our all-weather fighter squadrons will have air-to-air missile capability. (D)

So far we have considered only air defense missiles. The Navy's second basic requirement involves attack missiles. These are intended for attack against both sea targets and shore targets. Within this requirement, there are two categories of missiles, namely:

A. Air-to-surface-employable from either carrier or land-based aircraft.

B. Surface-to-surface-employable from either surface ships or submarines.

PETREL

In the air-to-surface category, the Navy has the PETREL in operation and several in development. (D)

PETREL is an air-to-underwater missile, designed to be carried and launched by long-range patrol-type aircraft and intended for standoff attack against surface ships.

It is now in service in VP–24, an Atlantic squadron. A Pacific squadron will be activated late this year. No additional squadrons are presently planned. (D)

Senator SYMINGTON. A very foolish question I am sure: Is there any use of this against submarines or only against surface ships?

Admiral CLARK. Surface ships only, sir.

Mr. HAMILTON. Is it in operational units now?

Admiral CLARK. Yes.

Mr. HAMILTON. You have one squadron?

Admiral CLARK. We have one squadron of this in the fleet now. A second squadron will be so equipped this year.

Mr. HAMILTON. How many aircraft in those squadrons?

Admiral CLARK. Twelve in the P2V–6 class. (D)

Mr. HAMILTON. They are land-based planes, are they?

Admiral CLARK. Land-based planes. (D)

Senator SYMINGTON. Please proceed, Admiral.

SURFACE-TO-SURFACE MISSILES

Admiral CLARK. This brings us to the surface-to-surface category. It is in this category wherein the Navy can make a particularly significant contribution to our total offensive military readiness.

The present Navy surface-to-surface missile capability supplements conventional aircraft delivery. In time, reliance on missile delivery will increase. In time also, enemy defenses will dictate improvement in missile performance in order to insure the required penetration and target coverage.

REGULUS I

The Navy program provides for the following:

REGULUS I which is currently available for deployment and use from submarines, cruisers, and carriers. (D) It is launched either by auxiliary solid-rocket boosters or from carrier steam catapults. Its cruise power is by turbojet engine. Its payload is either atomic or

thermonuclear. At the present time, 4 carriers, 4 cruisers and 2 submarines may be deployed with this missile. Additional submarines are under conversion or construction.

Senator SYMINGTON. May I ask some questions there before the chart goes off the screen? This is sort of a pilotless airplane?

Admiral CLARK. That's right; yes, sir.

Senator SYMINGTON. Like the SNARK, something along those lines?

Admiral CLARK. Yes, sir; very similar. It is launched either by solid-rocket boosters or from carrier steam catapults.

Senator SYMINGTON. You say, "At the present time, 4 carriers, 4 cruisers, and 2 submarines may be deployed with this missile."

Does that mean they are available to take it if they want to use it?

Admiral CLARK. They are ready to be deployed.

PRESENT REGULUS BECOMING OBSOLETE

Senator SYMINGTON. In no sense of criticism, this missile, as missiles are being developed, is getting obsolete pretty fast; isn't it?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. When you say additional submarines are under conversion or construction, they would take whatever your newer stuff is; wouldn't they?

Admiral CLARK. Yes, sir. For the followup missiles to the REGULUS, they can be carried and operated by the same ships in a ratio of 1 for 2.

Senator SYMINGTON. That is what I wanted for the record.

Admiral CLARK. We plan to have an advanced version of this missile in a few years. (D)

Senator SYMINGTON. Why don't you get that earlier? (D)

IMPROVEMENT DELAY DUE TO TECHNOLOGICAL PROBLEMS

Admiral CLARK. Well, we are prosecuting this as fast as we think we can.

Senator SYMINGTON. As fast as you think you can or as fast as you can with what is available to you in the way of development costs?

Admiral CLARK. No, sir. I think this missile is going as fast as it can, Mr. Symington. There are technological problems to be overcome in this. (D)

Senator SYMINGTON. What kind of targets would you use it on?

Admiral CLARK. Enemy shipyards, enemy shipbuilding yards, submarine bases, submarine pens, and any targets that we might be requested to hit in support of the Army, in support of the Marine Corps, or landings or any targets that we might be requested by the Air Force to assist them in. (D)

IN THE FUTURE, ANOTHER MISSILE

Admiral CLARK. This missile, like the REGULUS I, is capable of being landed again as we fly it. (D)

In our test program in the REGULUS I we have had as many as 12 landings on one missile. We take it up, put it through its paces, run our research and development program, bring it back, and land it and use it again.

This missile is capable of the same performance. It has undergone taxi tests at Edwards recently, and should fly this month.

LAUNCHING MISSILES FROM SUBMARINES

Senator SYMINGTON. I am one who believes this whole idea of launching missiles by an enemy from submarines is as dangerous as any potential danger this country faces today. But you hear a lot of talk about the launching being very difficult.

What is the situation with respect to launching missiles from submarines? As long as you have that picture, give us background on that. (D)

How many submarines have we that can do this?

Admiral CLARK. We have two at the moment. We don't have the missile yet, but we have two submarines that can launch REGULUS I and this missile will fit. (D)

Senator DUFF. If you had a submarine in the eastern Mediterranean, where would the range of this reach up into Russia?

Admiral CLARK. I would have to provide you with a chart for that, Mr. Senator. My geography isn't that good. (D)

Mr. HAMILTON. Senator Duff, as a point of information I might say that I think the Navy witnesses plan, in their subsequent presentation, to show you charts with overlays that would indicate ranges they can reach.

Senator DUFF. I will not take any more of your time, Admiral.

Senator SYMINGTON. Take all the time you want.

Mr. HAMILTON. What about the accuracy of this missile, sir?

Admiral CLARK. This will be a very accurate missile. (D)

Mr. HAMILTON. When are they programed for and in what numbers?

Admiral CLARK. May I supply that for the record?

(The information requested has been supplied to the committee in classified form.)

Senator SYMINGTON. You are putting so many in per year of these?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. This looks like a pretty effective weapon.

Admiral CLARK. We think that it will be; yes, sir. It is fast and of a respectable range.

Mr. HAMILTON. What would be the kind of defenses that could be used against a weapon of this [redacted]?

Admiral CLARK. The only defense that I can think of would be, of course, a guided missile, and the problem there is tracking the missile. A guided missile of this kind has a very small cross-sectional area, which means that it is difficult to pick up on radar and to track on radar, more so than an airplane.

Senator SYMINGTON. Can we track a missile of this kind on the radar that we now have?

Admiral CLARK. We can. We have had some success with this. The REGULUS I we have tracked, not always. The percentage of times I don't have at my finger tips. (D)

Senator SYMINGTON. Thank you, sir.

IMPORTANCE OF A BALLISTIC MISSILE

Senator SYMINGTON. Why are you so interested in the ballistic missile, or are you very interested in it?

Admiral CLARK. Yes, sir; we are, indeed. The ballistic missile is extremely attractive because of its greater invulnerability to countermeasures, and the fact that this condition will exist for many more years.

You have heard the story of the antimissile missile. This is a most difficult research and development program. (D)

Senator SYMINGTON. To track, in other words?

Admiral CLARK. Yes, sir. There is a foreseeable limit to the life of this. I think it will be many years yet. But the ballistic missile is very, very much more in the future; I mean the countermeasure.

Senator SYMINGTON. Admiral, we are asking as laymen: Do you expect to be able to develop a submarine to launch a ballistic missile, or would you launch it from other places, and if so, where?

Admiral CLARK. From surface ships and submarines.

Senator SYMINGTON. And submarines?

Admiral CLARK. Yes, sir.

BALLISTIC MISSILES FROM SUBMARINES

Senator SYMINGTON. How long do you think it will be before you can get a submarine that can launch an IRBM or ICBM?

Admiral CLARK. I think within the next year we will be reasonably sure of the form that the ballistic missile will take. We are now in the process of studying a number of ship designs.

At the time this firms, I would say we could build a submarine and have it ready shortly after the missile was ready. (D)

Senator SYMINGTON. Of course, you could launch a ballistic missile now from the deck of a carrier; couldn't you?

Admiral CLARK. We did that in 1948, sir.

Senator SYMINGTON. What missile was that?

Admiral CLARK. The V–2, sir.

Senator SYMINGTON. And you could do it for a big cruiser, too, probably; couldn't you?

Admiral CLARK. Oh, yes. This also is under study, what is the best type ship. It may be a battleship.

Senator SYMINGTON. So the reason for a ballistic missile lag incident to submarine use, is in the development of the missile itself rather than in the launching problem; is that right?

Admiral CLARK. That's correct.

Senator SYMINGTON. Plus the vertical aspect.

Admiral CLARK. Plus the vertical aspect and the ship navigation aspect. Now the ballistic missile, because of its invulnerability, is most attractive, but it is difficult to see, in the quite foreseeable future, that it will have the accuracy that this will, because this guides all the way.

Senator SYMINGTON. It has tremendous accuracy with that range? (D)

Admiral CLARK. That is correct.

Senator SYMINGTON. While we are on the subject, do you happen to know how many submarines we built last year?

Admiral CLARK. No, sir; I don't. We will have to provide that, sir.

(The information requested has been supplied to the committee in classified form.)

SMALL NUMBER OF NEW SUBMARINES AND CONVERSIONS

Senator SYMINGTON. And of those submarines we built, were they all capable of taking missiles?

Admiral CLARK. No, sir.

Senator SYMINGTON. They were not?

Admiral CLARK. No, sir.

Senator SYMINGTON. How many submarines did we build last year capable of taking missiles?

Admiral CLARK. We did not build any from the keel up. We converted one last year, completed the conversion last year.

Senator SYMINGTON. A converted submarine is not a modern submarine, is it?

Admiral CLARK. I would say yes, sir, it is modern except that it does not have nuclear power, but it would be a modern submarine in the sense that during this conversion it is streamlined and additional batteries are added.

Senator SYMINGTON. Specifically, did you convert one of your most modern submarines?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. One of the latest that you had built?

Admiral CLARK. We converted one last year to missiles, yes.

Senator SYMINGTON. You made three, I think. I may be wrong.

Admiral CLARK. Missile ships, sir?

Senator SYMINGTON. No; all told. (D)

Mr. HAMILTON. They would be used for REGULUS I?

Admiral CLARK. These are REGULUS I ships.

Senator SYMINGTON. Would you build any more submarines for missiles if you had more money; or do you think you would wait?

Admiral CLARK. I do not think I would speed it up for next year. After that, very likely, but it becomes awfully hard and costly in one of these things if you go a little too fast and find that you don't have what you want and it is a wrong job.

SOVIETS PROBABLY HAVE MISSILE LAUNCHING SUBMARINES

Senator SYMINGTON. How do the Russians build over 400 submarines, with all the potentials for launching that we have; how do they average building around 75 a year; and we only build 3?

They have all the problems too, don't they, the problem of materials and so forth?

Admiral CLARK. I don't know. I have received no intelligence that says the Russians have missile launching submarines. I assume that they do, of course.

Senator SYMINGTON. But you have not any that says they have not, have you?

Admiral CLARK. No. I have to assume that they do.

QUESTION OF WHY SOVIETS FAR OUTPRODUCE THE UNITED STATES IN SUBMARINES

Senator SYMINGTON. I don't know if they do or not, but am taking the figures of the Secretary of the Navy and the Chief of Naval Operations, both of whom have told the American people the Russians have over 400 submarines.

Admiral CLARK. That is correct.

Senator SYMINGTON. And I am wondering why, especially as the submarine today is much more of an offensive weapon than it used to be, with the capacity to launch these missiles, why we let them take such a gigantic lead over us in the production of submarines.

You would not want to comment on that, would you Admiral?

Admiral CLARK. No, sir.

Senator SYMINGTON. All right; will you proceed?

JUPITER IRBM, IN THE FUTURE

Admiral CLARK. Also in the surface-to-surface field is JUPITER—the fleet ballistic missile—the 1,500 mile IRBM.

This slide shows the general physical characteristics of JUPITER. Insofar as the missile is concerned, it is a joint development effort by the Army and Navy. The supporting ship-based system is being developed by the Navy.

As a weapon system the ballistic missile is made possible by the results of approximately 10 years of research and development in such fields as high thrust liquid rockets, solid propellants, gyroscopes, accelerometers, and radiometric star trackers.

The fruition of these developments—in propulsion, in stabilization, in precise navigation—coupled with significant reduction in weight of high-yield nuclear warheads, has cleared the way for the ballistic missile and its shipborne application. Ⓓ

The principal virtue of the ballistic missile is its inherently high invulnerability to countermeasures of all kinds. This results from its high speed, high midcourse altitude, and total independence of outside assistance for its guidance.

This seagoing missile system will not be operational for a few years. Ⓓ

SUMMARY OF MISSILE PROGRAM

In summary, I would like to say that:

A. The Navy guided-missile program recognizes an essentially equal priority and urgency between fleet air defense and the attack missile requirement.

B. The Navy guided-missile program is not merely a matter of developing and procuring missiles. But, more importantly, it is a matter of integrating the missile capability into the shipbuilding and aircraft procurement programs.

In this connection, there are many special characteristics which must be built into missiles designed for naval use. These characteristics must be introduced in the earliest stages of ship design.

C. The end of this fiscal year will see TERRIER, SPARROW, PETREL, AND REGULUS I in the fleet. Ⓓ

D. The aircraft procurement program as related to missiles will result in an adequate fleet air-to-air missile capability in a years. (D)

E. The fiscal year 1957 shipbuilding and conversion program is an increment of a long-range program. It does not, of itself, provide the total requirement in missile ships and submarines. However, we are in a state of transition—a transition which wisely should not be sought overnight.

We need to build ships with new weapons—but we want, at the same time, to exploit the progress which science can be expected to make in the near future.

Senator SYMINGTON. Admiral, that is a fine briefing.

Mr. Counsel, have you some questions you would like to ask?

QUESTION OF ADEQUACY

Mr. HAMILTON. Yes; I have a few, Mr. Chairman. On the last page of the statement which you just concluded, Admiral, you state: "The aircraft procurement program as related to missiles will result in adequate fleet air-to-air missile capacity in a few years." (D)

I wonder if you would care to elaborate what you mean by the word "adequate."

Admiral CLARK. Well, I mean by that that we will have all-weather aircraft and missiles, combination, in numbers to equip the carriers we will have in service at the time.

Mr. HAMILTON. The phrase here is "air-to-air missile capability" and as I listened to your answer, you said "air-to-air missile and aircraft capability."

What I was coming to was whether or not, by that time, you would still be using aircraft in your air-to-air defense.

Admiral CLARK. Well, the air-to-air missile is carried by the aircraft.

What we mean "by this time," the air-to-air weapons system capability will be of a quality to be adequate for air defense. (D)

INTERCEPTOR AIRCRAFT NOT TO BE REPLACED BY MISSILES FOR YEARS

Mr. HAMILTON. During the period 1956 to 1960, will you still rely on interceptor aircraft to provide part of the defense for the fleet?

Admiral CLARK. Yes, sir; and years after that.

Mr. HAMILTON. In other words, you do not contemplate now a period of time in which the missile will supplant the interceptor?

Admiral CLARK. No, sir.

As I pointed out in the slide, we require defense in depth. And we are not prepared for that with guided missiles for some time. (D)

Mr. HAMILTON. Do you plan to use TALOS for the defense of any of your shore-based installations, defense against air attack?

ARMY DEFENDS NAVY SHORE INSTALLATIONS

Admiral CLARK. The defense of our shore installations is provided by the Army.

Mr. HAMILTON. Would that be the case in regard to the shore-based installations you might have outside the continental United States?

Admiral CLARK. I don't know what the plans call for, but my guess would be that we will have Marine battalions, we have Marine mobile guided-missile battalions, and every ship that is in port automatically becomes a part of the local air-defense scheme, and ships with surface-to-air guided missiles would become a part of that defense scheme.

Mr. HAMILTON. In the event you were involved in a peripheral war and a landing were made, what weapons would you use to protect the area from air attack?

Admiral CLARK. We would use guided missiles and interceptor aircraft. We would put Marine and Army units ashore with their surface-to-air missiles.

TALOS STILL IN R AND D STAGE

Mr. HAMILTON. How many TALOS do you have in operation now?

Admiral CLARK. TALOS is in the research and development stage.

Mr. HAMILTON. Still in the research and development stage?

Admiral CLARK. Yes, sir. (D)

NAVY R AND D EXPENDITURES

Mr. HAMILTON. I wonder if you could supply for the record, Admiral, the figures with respect to the research and development expenditures by the Navy in the missile field, say from 1941 down to date?

I think that the Air Force and the Army are giving us comparable figures, and I wonder if you could do that.

Admiral CLARK. Yes; I listened to that discussion this morning.

Mr. HAMILTON. You heard the discussion this morning and to the extent that you can, will you make the figures comparable?

In other words, if you could give us your comparable figures for Navy research and development during the period from, say, 1940 or 1941, whatever is a convenient starting date for you; then a breakdown, to the extent that it is practical, of research and development expenditures for missiles.

Then, within that breakdown, the expenditures for general categories of missiles.

Admiral CLARK. Yes, sir.

Mr. HAMILTON. Along the lines that we discussed earlier, which you heard in connection with the Army's presentation?

Admiral CLARK. Did I understand you to say 1941?

Mr. HAMILTON. Yes, if you can do it back to 1941, so that the committee will have the benefit of a sweep of time as far as the picture is concerned?

Admiral CLARK. We won't have guided missiles that far.

Mr. HAMILTON. I understand that, but when they do come in you could bring them out.

Admiral CLARK. Your discussion this morning was general research and development, you understand, and guided missiles did not make their appearance until after that.

Mr. HAMILTON. So I understand. When they did come into the picture break them out at that date.

(The information requested has been supplied to the committee in classified form.)

And then in that connection if it is the case, I think the committee would be interested if you could indicate the kinds, and something as to the order of magnitude of the extent to which the Navy research and development program was supported by funds from other categories in the budget, such as procurement, construction, again along the lines of the discussion this morning with the Army?

Admiral CLARK. Yes, sir.

(The information requested has been supplied to the committee in classified form.)

NAVY NOT WORKING ON ANTIMISSILE MISSILE

Mr. HAMILTON. Is the Navy in its research and development program working extensively on antimissile missiles as defense measures?

Admiral CLARK. We are not.

Mr. HAMILTON. You are not?

Admiral CLARK. The need for an antimissile missile by the Navy—we are talking about ballistic missiles, that sort of antimissile missile is rather remote.

Senator SYMINGTON. If you will yield there just a minute.

You could not have a guided missile that would be an antiballistic ballistic missile, could you?

In other words, with the speed involved, there is no known guided missile, as we talk about missiles, that could be an effective interceptor, is there?

Admiral CLARK. Oh, yes, sir. The problem is detection, tracking briefly. After you track briefly this establishes trajectory.

You would then launch a guided missile to intercept it at some point in its trajectory with a nuclear warhead.

Senator SYMINGTON. And you think you could do that with a missile that had a much lesser speed than the ballistic missile itself?

Admiral CLARK. The speed of the missile that you are firing would be unimportant.

Senator SYMINGTON. Except from the standpoint of warning time?

Admiral CLARK. Precisely; yes, sir.

But I don't mean to belittle for one minute the terrific scientific problem involved here in the first part of it, the detection and tracking. (D)

Let's say if the launching site was definitely known and a radar maintained on that particular site, then I think that technology will someday, and not maybe in the too distant future, give us the necessary advancements to know when a missile has been launched and to track it and we will certainly recognize it as a missile when we see it.

Mr. HAMILTON. As I understand it, the Navy in its R. & D. program is not working on that problem.

Admiral CLARK. The Navy is not working on an antimissile missile. We feel the problems of the task force will not be complicated by ballistic missiles.

We are following very closely what the Army is doing in this, prepared to contribute our help in all that we can.

Also for air-to-surface missiles, we are intensely interested of course in that threat.

CARRIERS DO NOT WORRY ABOUT BALLISTIC MISSILE ATTACK

Senator SYMINGTON. You say you feel that the Navy will not be complicated by a ballistic missile attack?

Admiral CLARK. No, sir. I don't think a task force would be a target for a ballistic missile at all.

Senator SYMINGTON. Why not?

Admiral CLARK. A ballistic missile has to know its target right at the minute. Now it is possible, of course, for a task force to be tracked for some time and the advance position perhaps assumed or guessed and then you fire at this particular point.

But with the accuracy of ballistic missiles and the fact that once it is gone it is on its own, there is no changing it then; it must know its target accurately.

Senator SYMINGTON. In other words, the guidance capacity of a ballistic missile is such that if a fleet was at sea, it would be very difficult for it to be guided to give you trouble; is that it?

Admiral CLARK. Yes, sir; it would be a very wasteful employment of ballistic missiles.

I do not think they would be used.

SERIOUS QUESTION OF CARRIER VULNERABILITY TO NUCLEAR BALLISTIC MISSILES

Senator SYMINGTON. The other side of that is that you have some right effective weapons on that carrier. They either get the carrier or the carrier is going to get the city if you are carrying hydrogen bombs, which I hope you are if we get in any serious trouble.

Admiral CLARK. That is right.

Senator SYMINGTON. What is the speed of a ballistic missile, Mach 15? That would be about 10,000 miles an hour, wouldn't it, something like that? If a ballistic missile has a hydrogen warhead, it is going to go a long way in a pretty short time? (D)

Admiral CLARK. It will cover that in about 25 or 30 minutes.

Senator SYMINGTON. It will do better than that?

Admiral CLARK. 1,500 miles?

Colonel GALER. Roughly 100 miles a minute.

Senator SYMINGTON. If it was 10,000 miles, that would be a thousand miles every 6 minutes; that would make 9 minutes; wouldn't it?

Ten thousand miles an hour would be a Mach of 15.

I am just thinking out loud. If that was true roughly, it would be going a thousand miles every 6 minutes, would it not?

Admiral CLARK. When we say Mach 15, the number of miles an hour that this is varies with altitude. That is why we use the term "Mach." The speed of sound changes with altitude. (D)

Senator SYMINGTON. That is right. It is 760 miles an hour at 30,000 feet. (D)

In 25 minutes a carrier would move what? What are your fastest carriers now?

Admiral CLARK. Thirty knots. It would be 15 miles.

Senator SYMINGTON. In open hearing, we had a member of the AEC before a subcommittee of the Senate Armed Services Committee, who said that in an airburst the radius of total destruction would be 4 miles, the diameter therefore 8 miles, total destruction.

That would give you an area of 48 square miles, I think. Especially as a waterburst of a hydrogen bomb is particularly lethal, I would not think you could dismiss it as not being a possibility.

Admiral CLARK. We do not.

Senator SYMINGTON. I am out of my field now.

Admiral CLARK. That is why we are watching very closely what the Army is doing in this.

We expect to work with them.

Senator SYMINGTON. But if you can go 1,500 miles in 25 minutes, and if a carrier is moving at the rate in 25 minutes of 15 miles or thereabouts, based on a megaton bomb, you still have a problem, I would think, unless the information we got from the AEC is wrong.

Does that make sense to you?

Admiral CLARK. Yes, sir. I would not want to be within 15 miles of a megation bomb.

Senator SYMINGTON. I don't want to be within a hundred miles of one.

Mr. HAMILTON. One other question, if I may, Admiral.

You mentioned in your testimony, I believe, that in the case of the REGULUS I you fire and recover the missiles you are using in your tests?

Admiral CLARK. Yes. (D)

Mr. HAMILTON. I think that is all.

Senator SYMINGTON. Senator Duff?

Senator DUFF. I wonder if we could ask the admiral to let us see that last slide again.

In what stage is the development of this now, Admiral?

A MISSILE FOR THE FUTURE

Admiral CLARK. This missile is being developed for us by the Army, and their plan and approach to the problem is to take off from where the Redstone missile now is. The Redstone missile is in effect this missile, very much smaller all around.

It will not be operational for a few years. (D)

IF MISSILE FIRED FROM 200 MILES OFFSHORE

Senator DUFF. Then, when this is available, it would seem that there would be no city within a thousand miles of any waterfront that could not be destroyed by this, would it?

Admiral CLARK. 1,500 miles from a position 200 miles offshore will reach all but a very small part of the interior of the Asian Continent; yes, sir.

Senator SYMINGTON. Of the what?

Admiral CLARK. Of the Eurasian Continent, a very small sector right in Siberia.

Senator SYMINGTON. The Russians aren't going to let you get within 200 miles offshore if they can possibly help it, are they?

Admiral CLARK. I think that they would do everything they could to keep us from it.

Senator SYMINGTON. I think you have got a great potential weapon.

QUESTION OF FUTURE OF SAC

Senator DUFF. I was going to say that if this comes along that fast, you won't need much of a strategic air force if you have these things available.

Senator SYMINGTON. With a reservation. A supersonic bomber is going faster than any ship, or even a transonic bomber, or even a subsonic bomber.

It is a question of how close you can get before you operate.

Senator DUFF. It would seem to me that this introduces a whole new threat.

It was unbelievable a very short time ago.

Mr. HAMILTON. Particularly when you take the submarine base aspect.

Senator DUFF. Yes, and if you are traveling under water it is going to be pretty hard to know just exactly where your submarines are, so it is not figuring on a definite base you can grab. You do not know where the guy is going to come up and hit you.

SUBJECTS FOR FUTURE BRIEFINGS

Senator SYMINGTON. Have you talked about our ability to discover submarines? How far out do we think we can——

Admiral CLARK. I don't know the exact figure, Mr. Chairman.

Senator SYMINGTON. What is it roughly?

Admiral GRIFFIN. That will be covered fully.

Senator SYMINGTON. Admiral if we ask any questions that are going to be covered later, by all means say so.

On what briefing will we get that?

Admiral GRIFFIN. The first briefing you will get that on, sir, will be the first briefing we have scheduled for manned aircraft, which I understood is the one you want next.

Vice Admiral Combs will cover that in his presentation.

Mr. HAMILTON. Will he also cover, Admiral, the research and development programs that are going forward in that regard, or should we address questions on those to Admiral Clark?

Admiral GRIFFIN. No; I think research and development—we are preparing to handle that separately in accordance with the conversation I had with you.

Mr. HAMILTON. That is research and development on defense against submarines and things like that?

Admiral GRIFFIN. Yes; the whole field of research and development.

Senator SYMINGTON. I see. This briefing is strictly missiles.

Admiral CLARK. Correct. Strictly missiles, yes, sir.

Senator SYMINGTON. If we have been too nosey about it—that is not the right word—forgive us because when you get started——

Senator DUFF. This is a nosey committee anyway.

Senator SYMINGTON. And well it should be.

Senator DUFF. I am not objecting to it. This information that has just been developed to me is miraculous.

Mr. HAMILTON. When the Senator sees the overlays and charts these gentlemen have, I think he will be even more impressed.

SUFFICIENT FUNDS FOR MISSILES IN VIEW OF OTHER PROGRAMS

Senator SYMINGTON. Let me ask one final group of questions. Are you satisfied—we asked this of the other services—with the amount of money you are getting for your missile development?

Admiral CLARK. Yes, I am, Mr. Chairman, for this reason. The Navy is in a different position than the other services. The number of missiles we procure is related directly to the number of airplanes and ships we have. We have plenty of missiles in our program to take care of the surface ships, the submarines, and the aircraft; and the research and development funds that we have this next year are ample to keep our programs going.

Senator SYMINGTON. You do not in any way underrate the importance of the missile development to the Navy, do you?

Admiral CLARK. No, sir.

SATISFIED WITH ORGANIZATION AND COOPERATION

Senator SYMINGTON. Are you satisfied with the organizational setup incident to the development and production of missiles in the Department of Defense?

Admiral CLARK. Yes, sir.

Senator SYMINGTON. Are you satisfied with your relationship with the Army in the development of the JUPITER?

Admiral CLARK. Oh, very much so; yes, sir.

Senator SYMINGTON. You think that is coming along fine?

Admiral CLARK. That is coming along fine.

Senator SYMINGTON. Senator Duff?

APPRECIATION

Senator DUFF. No, sir. I just want to say to you, Admiral, this has been a very revealing and very wonderful briefing.

Senator SYMINGTON. I fully agree. It has been fine.

Thank you very much, gentlemen.

(Whereupon, at 3:45 p. m. the committee was adjourned.)

STUDY OF AIRPOWER

THURSDAY, MAY 31, 1956

UNITED STATES SENATE,
SUBCOMMITTEE ON THE AIR FORCE OF THE
COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee (consisting of Senators Symington, Jackson, Ervin, Saltonstall, and Duff) met, pursuant to recess, at 2 p. m., in room 212, Senate Office Building, Senator Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington, Jackson, and Duff.

Also present:

Fowler Hamilton, general counsel; Ramsay D. Potts, Jr., associate general counsel; Fred B. Rhodes, legal consultant to Senator Saltonstall; Edward C. Welsh, assistant to Senator Symington; and Wallace L. Engle, staff member.

Maj. Gen. Russell L. Vittrup, Assistant Deputy Chief of Staff for Military Operations, Department of the Army; Maj. Gen. Donald P. Booth, Assistant Deputy Chief of Staff for Personnel, Department of the Army; Brig. Gen. Joseph B. Crawford, Deputy Director of Personnel Operations, ODCSPER, DA; Brig. Gen. Ronald D. Salmon, USMC, Assistant Director, Division of Marine Aviation, Office of Chief of Naval Operations; Col. Louis B. Grossmith, Jr., Special Staff Group, HQ, USAF; Col. Granville A. Sharpe, ODCSPER, DA; Col. William P. Jones, Jr., ODCSPER, DA; Brig. Gen. George R. Mather, Deputy Director of Personnel Plans, ODCSPER, DA; Col. Paul H. Symbol, ODCSLOG, DA; Lt. Col. Fred. D. Clarke, Jr., ODCSPER, DA; Lt. Col. Irving R. Obenchain, Jr., OCSigO, DA; Captain McHugh, Captain Robertson, Captain Massey, Captain Outlaw, Commander Elkins, Commander Haller, Rear Adm. J. S. Russell, Comdr. W. W. Suydam, Comdr. M. F. Weisner, Comdr. R. E. Warner, Comdr. R. D. Macklin, Capt. S. R. Broan, Rear Adm. Griffin, Vice Adm. Combs, Capt. J. S. McCain, Capt. D. L. Martineau, Rear Adm. W. V. Davis, Capt. N. J. Frank, Jr., Capt. T. F. Connolly, Capt. S. S. Searcy, Captain McKee, and S3/c J. G. Muchek; Jack L. Stempler, Assistant General Counsel, Department of the Army; Clarke A. Morgan, OSD, Security Office; Bernard S. Bogdanowicz, OSD, Security Office.

[The first witness was Maj. Gen. Donald P. Booth, Assistant Deputy Chief of Staff for Personnel, Department of the Army. His testimony appears in part X of the printed hearings.]

Mr. HAMILTON. Mr. Chairman, we now have Admiral Combs and his staff.

Senator SYMINGTON. Admiral Combs, we welcome you.

Admiral COMBS. Thank you, sir. Glad to be here, sir.

Senator SYMINGTON. At this point I should like to insert in the record a résumé of your outstanding career.

VICE ADM. THOMAS S. COMBS, UNITED STATES NAVY

Thomas Selby Combs was born in Lamar, Mo., on March 25, 1898, son of Orin P. and Grace L. (Davis) Combs. He attended high school in Lamar and Marion (Alabama) Military Institute, before his appointment to the U. S. Naval Academy, Annapolis, Md., from the 15th District of his native State in 1916. While a midshipman he played football, was company commander and, during the summer of 1918, served on the U. S. S. *Kansas* which operated on escort duty during World War I. Graduated and commissioned ensign on June 7, 1919, with the Class of 1920, he subsequently advanced in rank, attaining that of rear admiral to date from October 22, 1943. He was promoted to the rank of vice admiral, to date from June 27, 1953.

After graduation from the Naval Academy in 1919, he had consecutive duty afloat until June 1922 in the battleships *Florida*, *Minnesota*, *Connecticut*, and *Nevada*. Ordered to the Naval Air Station, Pensacola, Fla., he had flight training there and on December 21, 1922, he was designated naval aviator. In March 1923 he jointed Fighting Squadron 2, attached to the tender *Aroostook*, and later based on the aircraft carrier *Langley*.

He had duty at the Naval Air Station, Coco Solo, C. Z., between July 1925 and February 1928. After service in the air department of the aircraft carrier *Saratoga*, which extended to May 1930, he reported for instruction in aeronautical engineering at the postgraduate school, Annapolis, Md. He continued the course from June 1931 to June 1932 at the Massachusetts Institute of Technology at Cambridge, from which he received the degree of master of science in June 1932. The following year he served in the flight test section, Naval Air Station, Anacostia, D. C., and in June 1933 joined Fighting Squadron 1 (later designated Bombing Squadron 2), based on the *Saratoga*, to serve as executive officer until June 1935.

He was assigned until June 1936 to the Powerplant Design Section, Bureau of Aeronautics, Navy Department, Washington, D. C., after which he had duty as flight test officer at the Anacostia Air Station. In June 1937 he assumed command of Scouting Squadron 6 based on the carrier *Enterprise* until the fall of 1937, and then on the U. S. S. *Yorktown*. He reported in June 1938 as engineer officer for Aircraft engines on the staff of Commander Aircraft, Scouting Force, U. S. Fleet, U. S. S. *Memphis*, flagship.

From July 1939 until September 1941 he served in the Detail Section, Officer Personnel Division, Bureau of Navigation (later redesignated Bureau of Naval Personnel), Navy Department, Washington, D. C., and after fitting out the U. S. S. *Casco* commanded that seaplane tender from her commissioning December 27, 1941, until August 1942. He received a Letter of Commendation with authorization to wear the Commendation Ribbon, from the Secretary of Navy. He also received a second Letter of Commendation with authorization to wear the Commendation Ribbon and Combat "V," from the commander in chief, United States Pacific Fleet.

In September 1942 he reported for duty as Chief of Staff and Aide to the Commander Aircraft, Southwest Pacific Fleet, and in July 1943 in the rank of commodore, succeeded to that command, with additional duty as Commander of Fleet Air Wing 10. In July 1944 he was assigned further additional duty in command of Fleet Air Wing 17.

As Commander United States Naval Aircraft, Seventh Fleet, with additional duties as Commander United States Naval Aircraft, Southwest Pacific Area, Commander Task Force 73 and Commander Fleet Air Wing 10 and 17 from July 2, 1943 to July 3, 1944, he was awarded the Distinguished Service Medal.

He returned to the United States in July 1944 and assumed command of the U. S. S. *Yorktown* on September 29, 1944. Under his command that aircraft carrier participated in operations from Okinawa south to Formosa (October 1944); strikes in the Philippines (November 11, 15, 19, 1944); supported landings and bombarded Luzon (December 14–16, 1944); operations between Luzon and Okinawa (January 1945); strikes on Tokyo Bay and Okinawa (February 10–27, 1945 and March 14–April 1945, respectively).

He was awarded the Silver Star Medal as Commanding Officer of the U. S. S. *Yorktown* in action against enemy forces in the vicinity of Kyushu, Japan, on March 18, 1945. He is also entitled to the Ribbon for and a facsimile of the Presidential Unit Citation awarded the U. S. S. *Yorktown*.

Detached from command of the *Yorktown* in April 1945, he then reported as Chief of Staff and Aide to Commander, Seventh Fleet. He was awarded the Legion of Merit "For exceptionally meritorious conduct (in the latter capacity) during operations against enemy Japanese forces in the Southwest Pacific Area from April 29 to November 1945."

Returning to the United States on January 20, 1946, he reported in March as Assistant Chief of the Bureau of Aeronautics for Material and Services, Navy Department, Washington, D. C., and on August 1, 1946, became Deputy Chief of that Bureau. He continued to serve in that capacity until April 1949, when he assumed command of Carrier Division 1. (His title changed in January 1950 to Commander Carrier Division 2.) On April 10, 1950, he joined the staff of the Commander in Chief, United States Atlantic Fleet, as Chief of Staff and Aide.

On March 2, 1951, he was appointed Chief of the Bureau of Aeronautics, Department of the Navy, for a 4-year term, assuming that duty on May 1, 1951. Before the term expired, he was designated Commander 2d Fleet, reporting on June 30, 1953, and on March 6, 1954, became Commander, 6th Fleet. In December of the same year, he was ordered to duty as Deputy Chief of Naval Operations (Air), Navy Department, and assumed that duty on April 11, 1955.

In addition to the Distinguished Service Medal, the Silver Star Medal, the Legion of Merit with Oak Leaf Cluster (awarded by the Commanding General, U. S. Army Forces in the China Theater), the Commendation Ribbon with Bronze Star and Combat "V," and the Presidential Unit Citation Ribbon, Vice Admiral Combs has the World War I Victory Medal, Escort Clasp; American Defense Service Medal; Asiatic-Pacific Campaign Medal with 1 silver star and 2 bronze stars (7 engagements); World War II Victory Medal; Navy Occupation Service Medal, Asia Clasp; China Service Medal; National Defense Service Medal; and the Philippine Liberation Ribbon. In January 1946 he was awarded the Grand Cordon of Yun Hui (Cloud and Banner, 2d grade), by the President of China for assistance rendered in movement of Chinese Armies.

His official address is Tallahassee, Fla. He is married to the former Agnes M. Williamson of Tallahassee.

Senator SYMINGTON. We are honored to have you here with us, Admiral. It is my understanding that you have discussed with counsel your presentation today?

Admiral COMBS. Yes.

Senator SYMINGTON. Will anybody else besides yourself be testifying?

Admiral COMBS. Today General Salmon will follow my main presentation. His presentation will last about 15 minutes.

Then I have two further presentations which have been requested since this one has been written.

Senator SYMINGTON. You have all the time you need and more.

We want to hear you in full. It was not the intention of the committee to get into naval air, but that was urged upon the subcommittee by some of our colleagues, specifically Senators Saltonstall and Duff. Now that you are here, we want the whole story.

General COMBS. Thank you, sir.

Would you have the General—your name again, sir?

General SALMON. General Salmon.

Senator SYMINGTON. General Salmon and anybody else that you might call on——

Admiral COMBS. Mr. Chairman, I have specialists here in several areas. If it would be aggreeable with you they could raise their hands.

Senator SYMINGTON. Fine. Let's have all sworn together.

Gentlemen, do you solemnly swear that before this Subcom nittee on the Air Force of the Senate Armed Services Committee you will tell the truth, the whole truth and nothing but the truth, so help you God?

The following persons were sworn: Vice Adm. Thomas S. Combs, Brig. Gen. R. D. Salmon, Rear Adm. C. D. Griffin, Comdr. J. S. Elkins, Comdr. R. E. Warner, Comdr. M. F. Weisner, Rear. Adm. J. S. Russell, Capt. S. R. Brown, Capt. H. Massey, Capt. E. C. Outlaw, and Capt. T. F. Connolly, United States Navy.

Senator SYMINGTON. It has been the custom of the committee to hear the briefings through before asking questions.

However, if counsel, or any member of the committee would like to ask a question for clarification we will take the liberty of interrupting you on that point.

TESTIMONY OF VICE ADM. THOMAS S. COMBS, DEPUTY CHIEF OF NAVAL OPERATIONS (AIR), UNITED STATES NAVY

Admiral COMBS. Mr. Chairman and members of the committee, I am pleased to be present today in my capacity as Deputy Chief of Naval Operations (Air) and to discuss with you some of the more important aspects of naval aviation.

Since preparation of my original statement the Chairman has requested that I provide detailed statements concerning the P6M Seamaster and the Navy's airlift capabilities.

These additional statements are ready and will be given following my coverage of the general subject of naval aviation.

During this discussion I shall show you, although in somewhat abbreviated form, the role of naval airpower in the Navy's assigned tasks, and, the capabilities of our men and equipment to do the job. The overall security classification of my presentation is "top secret."

Senator SYMINGTON. At that point I would like to interrupt. Is there anybody in the room who is not cleared for top secret information?

(No response.)

Senator SYMINGTON. Is there any atomic information that you plan to give in this briefing?

Admiral COMBS. There is, sir, which I would like to have off the record.

At the appropriate time I will request that.

Senator SYMINGTON. Is there anybody in the room who has ot a Q clearance?

If so, will they please stand up?

Will you give your ame, please.

Mr. MUCHEK. I am Yeoman Third Class J. G. Muchek, sir.

Senator SYMINGTON. Admiral, will you take the responsibility for this member of the Navy?

Admiral COMBS. I will, yes, sir.

NAVAL AIR POWER A PART OF NAVY AND MARINES

May I emphasize here that naval air forces are tailored to the fabric of naval requirements. Wherein naval aviation contributes to the aggregate air power of this Nation, it does so as an integral element of the United States Navy and of the United States Marine Corps.

SIXTY PERCENT OF NAVY AIR IS COMBAT FORCE

Naval aviation is a sizeable force. It consists of about 10,000 operating aircraft, representing approximately one-third of our national strength in numbers of planes. Forty-three percent are in our Fleet Combat Forces, and 17 percent in Fleet Supporting Units. The remaining 40 percent are divided between the Training Command and the Naval Air Reserve Program.

You are aware of the role of the Navy in executing our national policy of collective security. We have the commitment for certain naval forces to be continuously deployed overseas. These forces act as deterrents to aggression. The United States Navy's worldwide deployment, in furtherance of our national policy, is shown in figure 1. Here are shown the principal locations of the operating forces provided by commander in chief of the Atlantic Fleet and commander in chief of the Pacific Fleet.

In the Far East is stationed the 7th Fleet. The 6th Fleet is maintained in the Mediterranean area. Most of the remainder of our forces are currently in continental waters with ready units assigned to the 1st Fleet in the Pacific, and to the 2d Fleet in the Atlantic.

PART OF NAVY IN FORWARD AREAS

From these 1st and 2d Fleets, additional striking forces are available in the event of hostilities. A part of our forces are deployed in the forward areas, that is, to the Western Pacific and to the Mediterranean. (D)

An appreciation of the quantity of tools available in our fleets today can be gained from figure 2, which lists all of our active forces, by fleets, and by types. I will not take time now to go through all of the various ships and aircraft squadrons. I will cover the aviation forces in detail later. However, as an example, under ships, you can see that we have a total of 15 attack carriers in the active fleets; 6 are in the Atlantic and 9 are in the Pacific.

Going down the list of ships you will note the same breakdown for the antisubmarine carriers, battleships, cruisers, destroyers, and so forth.

Among the fleet forces, you see service ships. There are the oilers, the ammunition, and provision ships, which keep our fighting forces supplied at sea. They allow our combatants to operate at sea for protracted periods—independent of fixed bases ashore. When the service vessels transfer fuel, beans, and bullets into our carriers at sea, they inject simultaneously the highly important ingredient of mobility.

Senator SYMINGTON. On that last slide, are we going to cover the details of all those presentations later on?

Admiral COMBS. Put on the last slide please.

Senator SYMINGTON. For example, are all the attack carriers the same size?

Admiral COMBS. We will cover that.

Senator SYMINGTON. In submarines, what type and character are oceangoing? How many are nuclear propelled? Will that be covered later?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. The question of our relative submarine strength, especially in that submarines are now considered an attacking weapon with the missile potential, instead of just a defensive weapon.

All that will be covered later, will it?

Admiral COMBS. What I do not have in my statement we will fill in for the record through any statements that you will require; yes, sir.

(The information requested has been supplied to the committee in classified form.)

Senator SYMINGTON. Just to be sure, your feeling is that you will probably fill them in voluntarily in detailed briefings: is that right?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. For example, how many planes are in squadrons and so forth?

Admiral COMBS. Yes, sir; we have that.

Senator SYMINGTON. Senator Duff, have you any questions that you would like to ask against the details of that slide?

Senator DUFF. No, sir; not at this time.

Senator SYMINGTON. Will you proceed, Admiral?

Admiral COMBS. A detailed breakdown of units deployed in the Western Pacific, is shown in figure 3.

Most of these units are under the operational control of Commander Seventh Fleet. Task Force 77, our big punch in this area, is the attack carrier task force composed of 4 attack carriers and supporting cruisers and destroyers.

Also, there are antisubmarine, amphibious, and mine-warfare forces. The aircraft squadrons include airborne early warning, photo reconnaissance, and electronic countermeasure squadrons.

The United States Navy units in the eastern Atlantic and Mediterranean area, shown in figure 4, are assigned to the 6th Fleet. This fleet maintains an attack carrier striking force built around two attack carriers and their embarked squadrons. The carriers are supported by the cruisers, destroyers, and submarines. Amphibious and mine-warfare units are available.

The two patrol squadrons, the early-warning-squadron detachments, and the electronic countermeasure squadrons, augment the antisubmarine warfare and air-defense capability of the Sixth Fleet.

ATTACK AND SUPPORT CARRIERS

Senator SYMINGTON. What is the technical definition of an attack carrier?

Admiral COMBS. An attack carrier is a carrier whose main mission is to carry the war to the enemy. The word "attack" is used as opposed to defensive work.

Senator SYMINGTON. The difference between that and the other type carrier was called what?

Admiral COMBS. The other type carrier is called the support carrier.

Senator SYMINGTON. And what is the support carrier?

Admiral COMBS. The support carrier as a rule is the one that carries the antisubmarine warfare units to combat the submarines.

Senator SYMINGTON. Is that generally a smaller carrier?

Admiral COMBS. It may be the same size as the present small attack carriers. By small I mean the World War II type of carrier.

Senator SYMINGTON. But a support carrier could be an attack carrier and an attack carrier could be a support carrier; is that right?

Admiral COMBS. It could possibly, sir, except that the support carriers may not have all of the latest equipment on them to operate the most modern aircraft.

For instance, for our ASW airplanes, we do not need the steam catapult. They are slower airplanes and the support carrier would operate those smaller airplanes and helicopters, which would not need the heavy arresting gears either.

Senator SYMINGTON. That is very clear. Thank you.

Admiral COMBS. Figures 1 through 4 have shown the composition of our forces by fleets and by geographic areas. I will now turn to the functional groupings of our fleet forces, showing the forces as organized for the accomplishment of attack, antisubmarine warfare, continental defense, and logistic support.

In figure 5, naval aviation forces are indicated by stars. The remaining forces are surface and subsurface, most of whose operations are either in support of, or closely integrated with, aviation forces.

Senator SYMINGTON. I just want to be sure I understand this.

HUNTER-KILLER FORCES

What is a hunter-killer force?

Admiral COMBS. A hunter-killer force is a force made up of the support carrier, the CVS that I told you about a few moments ago, with its antisubmarine-warfare aircraft, its helicopters, and its specially trained destroyers.

That composes a hunter-killer force.

Senator SYMINGTON. And then what is a killer-submarine force?

Admiral COMBS. A killer-submarine force may be any submarines more than one, which are so configured as to be able especially to hunt out and to kill other submarines.

Senator SYMINGTON. Thank you.

AVIATION FUNCTIONS

Admiral COMBS. Here we have a detailed listing of aviation forces by functions.

Note the four major functional categories, attack, antisubmarine, continental defense, and marine aviation.

Marine aviation is being covered in detail by a separate presentation. The aircraft assigned to marine attack and fighter squadrons, as shown on this slide, are the same type as those assigned to similar Navy squadrons.

They have, therefore, the capability of operating from aircraft carriers, when required.

Now for a detailed examination of the functional categories in aviation.

First, the attack carrier striking force. These comprise 15 attack carriers and 126 aircraft squadrons available for operations with these carriers.

Three distinct types of attack carriers are now operationally employed. These are the *Forrestal*, *Midway*, and *Essex* classes. I will

describe each class in a moment, but first I would like to comment briefly on a subject that seems to reappear from time to time—the so-called vulnerability of carriers—a statement that is usually sponsored by individuals who have little or no experience in modern naval operations at sea.

QUESTION OF INVULNERABILITY

Nothing on earth is invulnerable to a properly placed atomic weapon. This obviously includes carriers. But these ships are tough. They have a built-in capability for defeating attack. They have a powerful and versatile air and submarine defense. They are practically immune to attack by long-range ballistic missiles.

The United States Navy has developed to a high degree the art of carrier operations in peace and in war. We have most of the world's experience in this field. The Navy is satisfied that these forces are among the least vulnerable of all targets on the surface of the earth, and immeasurably more so than any fixed base.

Senator SYMINGTON. Admiral, will you stop a minute for this phone call.

I will be back in less than 5 minutes.

(Short recess.)

Senator SYMINGTON. Thank you, Admiral, for your patience.

Will you proceed?

Admiral COMBS. I am on the attack carriers.

CARRIER PROGRAM

The Navy is satisfied that these forces are among the less vulnerable of all targets on the surface of the earth and immeasurably more so than any fixed base.

Now for the carriers themselves: The *Forrestal*, shown in figure 8, is the first ship of her class, and carries about 95 aircraft. Her flight deck, over three blocks long and wider than some runways, is capable of supporting the heaviest and fastest naval carrier aircraft now flying or planned for the foreseeable future.

Her sister ship, the *Saratoga*, joins the fleet this summer. Three additional carriers in this class are programed for completion by 1959.

Mr. HAMILTON. Is that during calendar year 1959 or fiscal year 1959?

Admiral COMBS. That is for fiscal year 1959.

Mr. HAMILTON. Will they be coming in progressively between now and then, or will they all be in during that year; can one tell?

Admiral COMBS. They will be coming in progressively.

They are about 1 year apart.

Senator SYMINGTON. Could I ask a couple of questions there for clarification?

Now this is the so-called supercarrier, is that right?

Admiral COMBS. We don't like to call it that, sir. That is what the public seems to like to call it. It is the natural evolution in the carrier program as we foresee it for the future.

CARRIER TYPES AND SIZES

Senator SYMINGTON. And it is the largest sized carrier?
Admiral COMBS. The largest size, yes, sir.
Senator SYMINGTON. And what is its tonnage?
Admiral COMBS. Its tonnage is about 60,000 tons.
Senator SYMINGTON. And the *Midway* class is the next?
Admiral COMBS. The *Midway* class is next, yes.
Senator SYMINGTON. What is the tonnage of that?
Admiral COMBS. It is about 45,000 tons.
Senator SYMINGTON. And the *Essex*?
Admiral COMBS. The *Essex* class is about 29,000 to 30,000 tons.
Senator SYMINGTON. And those are the three attack carrier types?
Admiral COMBS. Attack carrier types, yes, sir.
Senator SYMINGTON. And the support carriers, are any of them smaller than the *Essex* type?
Admiral COMBS. No, sir; the support carriers are also of the *Essex* type, but not modernized to the extent of those which are the attack.
Senator SYMINGTON. That is very clear.
Senator Duff, have you anything?
Senator DUFF. No, sir; I understand.
Senator SYMINGTON. Thank you.
Mr. HAMILTON. Just one more question, if I may, for clarification.
The total of 15 just includes the *Forrestal*? It does not include the *Saratoga* when you say 15 attack carriers?

FIFTEEN CARRIERS

Admiral COMBS. It does not include the *Saratoga* at the present time. The way we do it, sir, is as one carrier comes into commission, an older carrier goes out.
We keep 15 in commission.
Mr. HAMILTON. Fifteen is, so to speak, your table of strength for carriers?
Admiral COMBS. That is right, it is our force level.
Mr. HAMILTON. That would be throughout the period down through 1959?
Admiral COMBS. Yes, sir.
Senator SYMINGTON. As long as that question has been brought up, when you replace a carrier with a 60,000-ton carrier, do you replace one of 29,000 tons or do you replace one of 45,000 tons or have you no standard on that?
Admiral COMBS. We have, yes, sir. We replace the carrier which is of the smallest type and whose machinery has been used the most.
Senator SYMINGTON. In other words, you put your newest in and replace your oldest?
Admiral COMBS. We keep our newest, most capable ships in full attack commission.
The next class, the *Midway*, comprises 3 carriers. By March 1959 all 3 of these powerful ships will have been converted to operate the highest performance aircraft on the drawing boards today. This class is slightly smaller than the *Forrestal* and carries fewer aircraft, about 80, compared to the *Forrestal's* 95.

The next class is the *Essex*. These carriers bore the brunt of naval carrier fighting in World War II. Eight of these ships have completed angled deck conversions and all will be completed by January 1958. These ships carry about 65 aircraft.

Mr. HAMILTON. While we are still on carriers, if I may ask a question, it is not contemplated to replace any of the *Midway* class or the *Essex* class except with the three carriers you mentioned of the *Forrestal* class, is that correct?

Admiral COMBS. That is right.

There are more than three of the *Forrestal* class, but as they come in they will——

THREE MORE FORRESTAL CLASS CARRIERS

Mr. HAMILTON. As I recall it during the period between now and 1959 there would be three more of the *Forrestal* class that come into the fleet?

Admiral COMBS. I think that is right; yes, sir; three more in addition to the *Forrestal*.

Mr. HAMILTON. So that the composition of the fleet during sometime in fiscal year 1959 would be 15 carriers, 4 of which would be of the *Forrestal* class?

Admiral COMBS. And three would be of the *Midway* class and the rest would be of the *Essex* class.

Mr. HAMILTON. Thank you, sir.

HALF DEFENSE AND HALF ATTACK AIRCRAFT

Admiral COMBS. Now to the aircraft: Approximately half of those embarked are fighters and half are attack.

The first type of squadron, the fighters, have two functions: the destruction of enemy aircraft and the protection of our attack planes. A representative fighter is the North American FJ–3 as shown on the slide. Ⓓ

FIGHTER AIRCRAFT

This aircraft has a speed of 530 knots, an operating ceiling of 45,000 feet, and a combat radius of 300 nautical miles. It is being equipped with air-to-air missiles. Ⓓ

Although I will mention missiles from time to time, I am aware that a complete missile presentation has previously been given.

Mr. HAMILTON. Are those figures intended to convey the fact, Admiral, that these squadrons can be maintained, so to speak, on the 15 attack carriers?

Admiral COMBS. Yes, sir.

In December of this year the Chance-Vought F8U will commence replacing the FJ–3.

FIRST HIGH PERFORMANCE AIRCRAFT

Performance characteristics are as indicated. This is our first truly high performance, supersonic, aircraft. It is being equipped with air-to-air missiles. Both its speed and altitude are significantly greater than the speed and altitude of the FJ–3. Its combat radius can be increased by in-flight refueling. Ⓓ

Senator SYMINGTON. Now there will be a time, will there not, when we will know how many of these airplanes you have on order?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. And how fast you will get them; in other words the details of what is your production picture?

Admiral COMBS. I have the Chief of the Bureau of Aeronautics with me here today, sir.

Senator SYMINGTON. There is a plan to give that to us voluntarily?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. One question: You have here less than 15 aircraft per squadron. As I remember it, the Air Force has 45 planes in a wing, 3 squadrons to a wing. (D)

What is the composition of a squadron?

Admiral COMBS. Fourteen airplanes, sir.

Senator SYMINGTON. Fourteen?

Admiral COMBS. Fourteen.

Senator SYMINGTON. Do you have any reserve in a squadron?

Admiral COMBS. No, sir; we do not.

Senator SYMINGTON. Is it flat?

Admiral COMBS. Just flat out aboard the carrier.

If we become short through attrition in warfare, we bring in replacements.

Senator SYMINGTON. There are 25 fighters in an Air Force squadron, 75 in an Air Force fighter wing?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. You have 14 in a squadron?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. Thank you.

LIGHT ATTACK AIRCRAFT

Admiral COMBS. The second category, light attack, has the function of delivering conventional and atomic weapons against designated targets. Two typical light attack aircraft are the Douglas AD and the McDonnell F2H. (D)

The AD is a propeller aircraft with performance as shown in figure 13. I have here the Douglas AD. It is a propeller aircraft with performance as shown.

It specializes in low level missions. It is capable of atomic weapon delivery. Combat radius without refueling is very low. (D)

The F2H——

Mr. HAMILTON. If I may ask a question for clarification: Could you supply for the record, if you do not have them readily available, how many of the light attack are Douglas AD's and how many are the McDonnell? (D)

Admiral COMBS. Yes, sir.

(The information requested has been supplied to the committee in classified form.)

Mr. HAMILTON. Am I right in the impression I have, all are one or the other?

Admiral COMBS. They are the light attack or the Douglas and McDonnell.

As of now we are phasing them out and bringing in the A4D and the A3D.

Mr. HAMILTON. If you could supply for the record what the facts are on the progress——

Admiral COMBS. Yes, sir; as we go along here I think it will be shown.

Senator SYMINGTON. This is getting very interesting—if you will forgive, I want to be sure I understand these planes.

Based on the performance of that airplane with the exception of its combat radius, the sooner you replace that the better; wouldn't that be a fair statement?

Admiral COMBS. Well, sir, there is a difference of thought there.

Senator SYMINGTON. That is what I want to know.

Admiral COMBS. Now there are many people who believe, and I am inclined to agree, that there is a definite place in our attack for a low-level airplane.

Now there are many good reasons for that. That plane will come in at treetop height for miles and miles.

It stays below the radar screen coverage. It can come in at low level and has done just that over many, many miles through radar coverage without detection.

It comes in and provides one of the low-level attacks. It is called over-the-shoulder bombing wherein the plane comes in real fast, flips up, and the bomb leaves the plane and comes down to its burst altitude.

Senator SYMINGTON. But you can do that with an airplane that has much higher performance; couldn't you?

Admiral COMBS. We could, except, sir, as you well know, the higher performance planes with jet engines burn a tremendous amount of fuel coming in on the deck.

In their natural environment, they are very high and stay high.

Senator SYMINGTON. I was only talking from the standpoint of security; not about the money aspect.

Admiral COMBS. I am talking about high in altitude, not high in cost.

Senator SYMINGTON. I see. But you do not plan to use this plane in support of troops do you?

The Army talked about the advantages of treetop stuff, but the Marines have their own aviation.

Admiral COMBS. Well, the Marines use that same aircraft in support of troops.

Senator SYMINGTON. That is what I meant.

Admiral COMBS. They like it very much. The airplane will carry a tremendous load you know, for its size; with 1 engine it will carry up to about 7,000 pounds of bombs, and it can do a great deal of damage in support of troops. (D)

Admiral DAVIS. I should be sworn. I have been in atomic business for several years.

Senator SYMINGTON. Will you raise your right hand and be sworn, please.

Do you solemnly swear that before this Subcommittee on the Air Force of the Senate Armed Services Committee you will tell the truth, the whole truth, and nothing but the truth, so help you God?

Admiral DAVIS. I do.

The limitation is because of the escape distance; a slow speed airplane can carry heavy weapons. (D)

Senator SYMINGTON. This, in turn, is related to the thousand-mile combat radius?

Admiral DAVIS. Yes; and the escape distance for slow speed airplanes.

Admiral COMBS. That is part of the technique of the over-the-shoulder and the other kind of bombing.

Mr. HAMILTON. Were you going to show the gentlemen of the committee the over-the-shoulder technique?

Admiral COMBS. We can if the committee would like to see it. We showed it to the staff the other day.

Are you ready to proceed, sir?

Senator SYMINGTON. Yes, proceed.

Admiral COMBS. The F2H McDonnell is typical of currently operating jet attack planes. Performance is shown on the slide and it has atomic capability. (D)

Commencing in October of this year, 1956——

Senator SYMINGTON. Could I look at that a little longer?

Admiral COMBS. Yes, sir. That has a speed of 450 knots. It is a twin jet airplane, combat ceiling 47,000 feet, the radius unrefueled is up to 550 nautical miles.

Combat radius refueled is up to 800 nautical miles. (D)

Commencing in October of this year the Douglas A4D will replace the AD and the F2H. This aircraft is capable of delivering a diversity of atomic weapons. (D)

Now this is a very versatile small jet attack aircraft built by Douglas. Speed is 530 knots. Its combat altitude and radius are approximately comparable with those characteristics of the F2H. It might be pointed out that the combat radius of an aircraft varies somewhat with the weight of the bomb load it carries. (D)

HEAVY ATTACK AIRCRAFT

Our third carrier type, the heavy attack, has the function of delivering both conventional and atomic weapons. It can carry a heavier payload to greater ranges than the light attack aircraft. (D)

These squadrons are currently equipped with the North American AJ. This is a combination propeller and jet driven aircraft, one jet on the tail with the two conventional engines. It can deliver in all weather, using a radar comb sight, atomic weapons. (D)

This aircraft is now being replaced by the Douglas A3D.

The A3D is an all jet, heavy attack aircraft, which can deliver in all weather, atomic weapons. It has a speed of 515 knots with a combat ceiling of 40,000 feet, and a combat radius well in excess of 1,000 miles without refueling. (D)

CEILING VERSUS RADIUS

Senator SYMINGTON. You talk of a ceiling 40,000 feet. Do you figure that ceiling against your maximum radius and include in that your problem incident to reaching altitude? (D)

Admiral COMBS. That is right. That is to carry out the regular problem. The Air Force and we figure them just alike.

Senator SYMINGTON. In other words, just to be sure I understand, say you had a mission which required a shorter radius could you operate at a higher ceiling? (D)

Admiral COMBS. No, sir.

Senator SYMINGTON. You could not?

Admiral COMBS. No, sir. That is what we call the combat ceiling. That is the ceiling at which the rate of climb drops below 500 feet per minute.

Senator SYMINGTON. In Air Force briefings with respect to the potential of some of the Russian bombers, the Air Force gave them a higher combat ceiling capacity on a one-way mission than they did if the Russian plan of attack was to deliver the bomb and return to Russia.

Admiral COMBS. That is right.

Well we are not figuring those one way. If we were going to just disregard that airplane and its crew, we could have less fuel, which would mean that they would arrive over their target, maybe, with 1 hour of fuel remaining.

They might get to higher altitude in that condition.

Senator SYMINGTON. That is what I was trying to say when I asked you about a shorter radius. Then automatically you would be able to carry less fuel, and therefore I was asking could you have a higher ceiling.

Admiral COMBS. The reason I did not answer it that way, I did not even consider that we were going to abandon the plane.

Senator SYMINGTON. If you were to abandon the plane according to plan, a higher ceiling would be possible, would it not? (D)

Admiral RUSSELL. May I speak up? The answer is "Yes".

You arrive on the target with less fuel, that is, all you need to get home; therefore you can go higher.

Senator SYMINGTON. Will you give your name again, sir.

Admiral RUSSELL. Russell, Chief of the Bureau of Aeronautics.

(Discussion off the record.)

Senator SYMINGTON. Back on the record.

What would be the ceiling of this airplane, roughly, if you cut its radius in half?

If you cannot give that now, please furnish it for the record.

Admiral RUSSELL. We will furnish it for the record.

(The information requested has been supplied to the committee in classified form.)

Mr. HAMILTON. May I just ask one question, Mr. Chairman?

The refueling referred to, is that a single refueling?

Admiral COMBS. Single refueling, yes.

A3D SIMILAR TO RB66

Mr. HAMILTON. Am I right in the impression I have that this plane is, at least in some sense, comparable to the plane the Air Force calls the B–66?

Admiral COMBS. RB–66, yes, sir.

It is very much comparable to their reconnaissance plane.

Admiral RUSSELL. RB–66, yes, sir.

The differences are a little heavier tread.

On a carrier deck we can take a very high pressure. They want to use it on a softer field so they have bigger tires for example. There are all sorts of minor changes.

The design aeronautically is similar.

Senator SYMINTON. The B–66 is a refinement of this airplane. As I understood it, the Navy designed the B–66 and developed it; and the Air Force liked it and adapted it to land use.

Admiral RUSSELL. That is correct.

Mr. HAMILTON. Thank you.

BUDDY SYSTEM

Admiral COMBS. You have noted the extension of combat radius by inflight refueling. This is accomplished by a carrier-based tanker, or by employing the buddy system.

The buddy system, I would like to explain, is where two planes of the type go out together, the A3D; one is the buddy of the other one, one is the refueler and one receives the fuel.

The buddy will go out a certain distance with the man who is going off to make the strike.

He will refuel the other one and come back and the strike plane will go on to its objective.

The final category under attack carrier striking forces is special squadrons. These aircraft are specially configured for photoreconnaissance, airborne early warning, and antisubmarine operations in the vicinity of the task force.

You noted that I mentioned the introduction of three new replacement aircraft to our Fleet Forces. All three of these aircraft, that is, the F8U, A4D, and A3D, successfully underwent carrier suitability trials in April of this year. I have a short film showing them in action on the *Ticonderoga* and *Forrestal*.

DESCRIPTION OF PLANES IN OPERATION

With your permission, sir, I would like to show it.

It is a very short film.

Mr. HAMILTON. Is the *Ticonderoga Midway* class?

Admiral COMBS. *Ticonderoga* is a converted *Essex* class. This is the A4D, the one we showed as the light attack plane taking off on a steam catapult of the Ticonderoga.

There it comes in for a landing, taking a wave-off.

This time it will land.

This is the F8U, the first naval supersonic fighter. It is taking off the steam catapult on the *Forrestal*.

This plane is unique in that the after portion of the wing hinges at the fuselage.

In landing, the attitude of the wing you see there is increased without changing the direction of the fuselage. You see just behind the insignia there where the leading edge of the wing comes up.

This is the A3D with wings folded coming up the elevator. The A3D is what we term a heavy attack aircraft.

You will note that its wings and tail fold so that the overhead heights of the various hangar decks can be accommodated.

There he goes, a takeoff with the steam catapult.

Here it comes in for a landing.

That plane will weigh on takeoff about 75,000 pounds and on the return when it comes back and folds its wings to park, its weight will be down around 45,000 to 50,000 pounds.

I showed that film, Mr. Chairman, in order to indicate that those planes have successfully passed their tests.

They are in production and they are being introduced into the fleet as of now.

Senator SYMINGTON. Let me be sure I am straight.

The first one you showed was what?

Admiral COMBS. Was it the A4D?

Senator SYMINGTON. Has that got a delta wing on it, Admiral?

Admiral COMBS. Yes, sir.

Admiral RUSSELL. Delta wing with a tail.

Admiral COMBS. You want to see the slide of that again, sir?

Senator SYMINGTON. Yes; I would like to see it.

Admiral COMBS. There are several features about that airplane which we like very much.

One is the ease with which it can be manufactured. The engineers at Douglas varied from the normal practice of building airplanes,and they built it so that it can be done in a hurry, and it is comparatively cheap.

That is really a higher production airplane. It has been engineered for high production.

Senator SYMINGTON. What is its cost?

Admiral RUSSELL. I can give it to you in a minute.

Senator SYMINGTON. Just put it in the record later.

Senator SYMINGTON. What was the next one you showed us?

Admiral COMBS. The F8U. That is the Chance Vought; it is supersonic. (D)

Senator SYMINGTON. That is quite an airplane, isn't it?

Admiral COMBS. Yes, sir; that is a wonderful airplane.

Senator SYMINGTON. How many of those have you got?

Admiral COMBS. We are just coming into production on it. (D)

Senator SYMINGTON. We will look your schedules over. So you are out of the prototype stage on it?

Admiral COMBS. Yes, sir; we are in production on those.

ENGINES

Senator SYMINGTON. What engine have you in that ship?

Admiral COMBS. That has got the Pratt-Whitney J57.

The A4D that you saw has the Curtiss-Wright J65, and the A3D has the J57.

Now the difference in the RB66 also is that the RB66 has the J71 engine I believe, the Allison J71.

Admiral RUSSELL. That is correct.

UNIT COSTS OF AIRCRAFT

Mr. Chairman, may I provide the figures for the record on cost of these aircraft?

This is the 1957 cost, sir; for an A4D flyaway cost airplane complete with engines is $385,820.

Senator SYMINGTON. Is what?

Admiral RUSSELL. $385,820. That is the flyaway cost. The cost of spares to go with the airplane to keep it in service is $149,675 for a total unit cost of $535,495.

You asked about the F8U, sir. The flyaway cost is $700,804. Its unit support and spare and things to keep it in service is $342,237, total of $1,043,041.

Senator SYMINGTON. That is your supersonic fighter?

Admiral RUSSELL. That is supersonic fighter, F8U.

The A3D—these are last year's costs——

Senator SYMINGTON. Before you leave that, a great deal of the difference in that cost between those two must be in the engine, isn't it?

Admiral RUSSELL. No so much, sir.

Senator SYMINGTON. What is the reason then you can buy that first plane for such an extraordinary——

Admiral RUSSELL. It is lighter, more simply built.

Senator SYMINGTON. An amazingly low price for a ship like that.

Admiral RUSSELL. That is right. It was designed for this, the poor man's airplane, the Navy's.

The A3D2 unit cost flyaway is $1,875,657. Its unit support and spares cost $840,446; total cost for airplane and spares, $2,715,103.

REPLACEMENT IN THE FUTURE

Admiral COMBS. The A3D comes high. That is expensive. It is a big airplane, twin engines and the weight.

Senator SYMINGTON. When will you have a replacement for the A3D?

Admiral COMBS. Not for several years. It's in the development stage now. (D)

Mr. HAMILTON. All of these planes you have shown us are in production?

Admiral COMBS. These planes are in production, yes, sir. Many of them—Admiral Russell can show you the numbers—are in the fleet already.

Senator SYMINGTON. You will forgive us for taking this time. We read a lot and hear a lot about C–98's and B–47's and B–52's.

WANT FULL KNOWLEDGE OF NAVY AIRCRAFT

Now we want to know all about your airplanes.

Admiral COMBS. Yes, sir. (D)

Senator SYMINGTON. When we get into more detailed briefing, we want to see those charts and see what is the pace, the rate of modernization. It would be helpful if you would submit for the record a brief statement on your replacement program.

(The statement requested is as follows:)

REPLACEMENT RATE OF AIRCRAFT

(*a*) In the carrier fighter and attack categories we endeavor to program a replacement model every 3 years. Actual accomplishment will vary, naturally, with the capability of industry to produce the qualified replacements.

(*b*) Similarly, in the patrol and carrier antisubmarine, airborne early warning, and helicopter categories we plan replacement aircraft every 5 years. However, in these aircraft we maintain a constant equipment replacement program. In other words, as new and improved electronic or electromagnetic equipments become available they are retrofitted into the aircraft.

(*c*) In the transport, trainer, and utility categories we program replacements between 7 and 12 years or as circumstances require. For example, we have been

for some time programing the replacement of propeller trainers with jet trainers. This is a circumstance dictated by the overall transition to jets in the combat forces, even though some of the propeller trainers will not have reached the end of their programed life before replacement by jets.

ATTACK CARRIERS ARE NAVY OFFENSE

Admiral COMBS. The attack carrier striking forces are ready for atomic war. But at the same time we must retain a readiness for limited campaigns. This we have done. We have the capability for the precision delivery of conventional weapons. We maintain in the magazines of our carrier striking forces, a supply of conventional weapons which are ready for use. (D)

This ability to fight either the all-out global war, or any of the smaller, limited wars, gives our naval forces a versatility which is necessary in the political situation, as it exists today.

The attack carrier striking forces are the primary offensive weapons system of the Navy. These forces, with their strength, ruggedness, and versatility, constitute an important and vital part of our Nation's air offensive potential. They place a substantial element of our Nation's atomic retaliatory power at sea, on dispersed mobile bases.

I want to emphasize here that the offensive strength of these forces is an essential part of our antisubmarine warfare capability which I will discuss in more detail later.

Now while we are employing the offensive punch of our carrier striking forces, we must look to the defense of those forces. I will now discuss the problem of defense against enemy air.

ATTACKER ADVANTAGE

By the end of World War II we had the air defense problem quite well in hand; but with the advent of higher jet speeds and altitudes, the attacker regained an advantage. We are strengthening our defense position by extending our radar coverage, and by improving our fighters and our missiles.

(Senator Jackson entered the hearing room.)

Admiral COMBS. We are working hard on this problem. We know that an enemy who is willing to risk enough resources to do the job, can penetrate any air-defense system, land or sea, developed today. However, our attack-carrier forces enjoy advantages in at least four major areas in this regard.

CARRIER TASK FORCE CAN BE DETECTED BY RADAR

First, they are protected by their mobility. To know their location this morning will not be of great value tomorrow. An enemy must expend considerable effort to locate and track the force. A fast-moving task force at sea is not easy to find.

It is true that a high flying search aircraft can detect ships at sea by radar; but the problem is more than acquisition; the radar operator must indentify his target.

The blip on his radar scope may be a merchant ship, a destroyer, or a radar decoy. Meanwhile, our countermeasures equipment will have detected his radar signals, and then the hunter becomes the hunted.

ENEMY MUST CONCENTRATE STRENGTH AGAINST CARRIER FORCE

Second, the task force is a base complex of unusual strength. It is so potent that an enemy would indeed be foolhardy to ignore the threat it poses. The enemy must concentrate, therefore, a large force against it and he must do this in the face of our offensive strikes.

Third, the technical air-defense problems of detection and identification are easier of solution for the carrier force than is often the case at fixed bases. Our radar-warning nets, by proper positioning of pickets, both surface and airborne, can be adjusted to meet the immediate threat.

Fourth, we have certain advantages in passive defense. Dispersal is the most important, but also our combat ships are more resistant to blast, heat, and radiation than most surface targets. These are some of the inherent advantages of mobile naval forces.

Senator SYMINGTON. Admiral, on this question of defense, radar, what can be detected and what cannot, there has been considerable discussion recently, with pictures printed in newspapers, and statements made.

Now the committee will want to ask some questions about this.

Do we get into this later in the detailed briefings or will we come back to you?

Admiral COMBS. You will come back to me with your questions, I understand.

Senator SYMINGTON. Fine. We won't question about this now; but there are some questions we would like to ask in this field.

Admiral COMBS. Yes, sir; may I proceed, sir?

Senator SYMINGTON. Yes.

ANTISUBMARINE STRENGTH IMPORTANT

Admiral COMBS. Turning now to antisubmarine warfare. The ability to destroy enemy submarines in port and at sea continues to be of utmost importance. The forces I will now describe are in addition to the attack carrier striking forces, whose offensive capability is so necessary to successful prosecution of antisubmarine warfare.

Fig. 21 shows the antisubmarine forces which were included in the overall functional listing.

Before going into the details of these forces, I should point out that the capability of an antisubmarine aircraft is not necessarily related to its performance, in terms of speed and altitude, as is the case in fighter and attack aircraft.

As a matter of fact, slow speed is often a desirable characteristic.

The antisubmarine carrier forces consist of nine carriers and their associated aircraft. These carriers are of the unconverted Essex type, shown in fig. 22. They provide an excellent capability for antisubmarine operations.

Senator SYMINGTON. Senator Jackson, Senator Duff has asked a few and I have asked more questions. The Admiral agreed if there were any questions for clarification, we should go ahead and ask them.

Senator JACKSON. Fine. I will defer my main questions until the Admiral completes his statement.

I am not saying I understand these things, but if I have any particular difficulty that I note, I will ask about it as we go along.

I will save the substantive questions until later.

Admiral COMBS. Antisubmarine carrier aircraft include first, the search and attack squadrons equipped with Grumman S2F type planes.

ANTISUBMARINE AIRCRAFT

These aircraft have the mission of searching the areas surrounding the force, to locate and destroy submarines. (D)

Senator SYMINGTON. I am sorry, once you said the squadron is 14 planes.

Admiral COMBS. Those were the light attack squadrons which I understood you to ask about.

Senator SYMINGTON. That is right.

Admiral COMBS. These are a different kind of a squadron. They are antisubmarine warfare squadrons.

Senator SYMINGTON. What kind of a plane do you call this?

Admiral COMBS. That is the Grumman S2F.

Senator SYMINGTON. Is it a fighter-bomber?

Admiral COMBS. No, sir; it is an antisubmarine aircraft. It was built particularly for that.

Senator SYMINGTON. For a specific job?

Admiral COMBS. Yes, sir. (D)

The S2F is equipped with radar, electronic countermeasure equipment, and sonobuoys. (D)

Complementing and supporting the S2F aircraft aboard our antisubmarine carriers, are our helicopters. (D)

You see, sir, in that squadron you have 14 again.

Our squadrons are currently being equipped with the new Sikorsky HSS type antisubmarine helicopter. (D)

These copters have the primary function of precisely locating submerged submarines with their dunking sonar equipment. The sonar is lowered into the water by the helicopter while hovering. The versatility of the helicopter enables it to function as a screening vehicle or, to proceed quickly to a distant contact at relatively high speed.

It is a valuable adjunct to the carrier antisubmarine forces. The HSS–1 can carry the conventional antisubmarine homing torpedo as well as other weapons. (D)

Mr. HAMILTON. Are these operational now, Admiral?

Admiral COMBS. Yes, sir.

The antisubmarine carrier equipped with the above aircraft, along with the latest in weapons, constitutes a potent system for combatting enemy submarines. (D)

Used as hunter-killer groups, consisting of a carrier and its supporting ships, they search out and destroy submarines.

Used as escort groups, they provide antisubmarine protection to surface forces and convoys. As covering groups, they provide this protection in specific areas—amphibious landing areas for example. Fast moving and versatile, these forces fill an important requirement in our overall combat potential.

The next category is the antisubmarine patrol squadrons. (D) They have the function of searching ocean areas, of locating submarines and of destroying them. They have an extended radius of action. (D) The land-based patrol squadrons are equipped with Lockheed P2V type aircraft. Its characteristics are shown.

The seaplane squadrons are equipped with the Martin P5M, shown here. Note that it has a comparatively low cruise speed with high endurance. (D)

Mr. HAMILTON. Where is that based?

Admiral COMBS. They are based all over the world. We have them out in the Far East.

Mr. HAMILTON. One was land based?

Admiral COMBS. We have some land-based ones in Okinawa.

We have them land-based in Japan.

Senator JACKSON. P2V's and the Martin P5M are land based?

Admiral COMBS. The P5M is a seaplane. It is sea based. P2V is land based.

Senator SYMINGTON. P5M, is that a new airplane?

Admiral COMBS. No, sir; the P5M is not a new airplane.

Senator SYMINGTON. If you had a better airplane what would you get?

Would you keep the speed down?

Admiral COMBS. For hunting submarines we would keep to a medium speed. We do not need high speed.

What we like to have more than anything else is endurance, with the ability to carry the weapons specifically needed to hunt and to kill the submarines.

Senator SYMINGTON. If you wanted a plane to replace the P5M—let me rephrase that.

Is there a plane planned to replace the P5M?

Admiral COMBS. Not at the present time in the antisubmarine warfare category.

Admiral RUSSELL. May I suggest, Mr. Chairman, we have a presentation for research and development in aircraft coming up.

This very question will be answered.

There is one trend of thought which says let's go slower and have exceedingly slow landing speeds so we can land in the open sea.

There is another one says let's have a little more speed so we can develop our contacts farther.

Senator SYMINGTON. Admiral, these speeds are so much lower than the speeds of even the old airplanes that I was wondering if it was specifical in the design to get as low as 150 knots.

Admiral RUSSELL. Yes, sir.

I would like to tell you for example what this fellow does. He gets a contact where he has knowledge of a general location of a submarine, so he kicks out about four sonar buoys. These buoys land in the water, extend a radio antenna and tell him what is going on under the net.

The operator listens to the sound under water. An explosive charge can be dropped at some distance away. That echoes off the submarine hull and the fellow hears it.

Meanwhile he circles. This is sort of a search and a localizing business which this one does.

Then he carries the weapon. He carries a homing torpedo.

When he has located the submarine accurately underwater he drops the homing torpedo and it goes and finds the submarine and blows it up.

This is the sort of duty he performs, so you can see speed is not an object in this exercise.

Senator JACKSON. In other words, if you had greater speed, your equipment would not be able to do the job?

Admiral RUSSELL. It is unnecessary for the equipment, and it is actually a hindrance in some cases.

Senator JACKSON. Supposing you are searching an area. Is there a limitation on the ability of the equipment to cope with the situation if you are going over a certain speed, to locate it first, then to make your location——

Admiral RUSSELL. You see it is sort of a balance.

You want speed to get to the contact. This means distance. You want to cover the distance in some haste to get there but once you get there you want to slow down so you can use all these devices for locating.

Do I make myself clear?

Senator JACKSON. Yes, I understand you need speed to get there.

Admiral RUSSELL. You need slow speed to work your devices and stay in the area, so it is a compromise.

Senator SYMINGTON. What you would like in an improved airplane of this type would be maximum endurance, wouldn't you, so you could stay out the longest possible time?

ATOMIC AIRCRAFT NEEDED

Senator JACKSON. You would agree an atomic aircraft, the ANP thing, would help in something like this?

Admiral COMBS. It would help very much, yes, sir.

WORLD WAR II DEPTH CHARGES

As you remember in World War II, our depth charges, the submariners laughed at them if they got further away from the sub's side than 12 feet. (D) They did not pay any attention to them, they were just a nuisance.

Senator SYMINGTON. Say that again.

That is very interesting.

Admiral COMBS. The submariners felt that a depth bomb had really to come within 12 feet of the hull to be lethal. (D)

NEED MORE SURVEILLANCE AIRCRAFT IN WARTIME

Mr. HAMILTON. As you extend the degree of completion of the surveillance systems off each coast, will that require more aircraft, or can you manage with the aircraft that you have there?

Admiral COMBS. We believe we can manage with the aircraft that we have here.

In time of war we would have to augment those.

Mr. HAMILTON. Would you have time in time of war?

Admiral COMBS. Well, we have many trained reserve ASW squadrons, both of the small squadrons to operate S2F, carrier-based and also squadrons for operation of the land-based, longer-range P2V.

JATO ASSIST IN TAKEOFF

Senator SYMINGTON. Can you take a P2V off a carrier?

Admiral COMBS. You can take it off, yes, sir. We have done that.

It is a special operation using JATO assist, but you can't bring it back on board.

Senator SYMINGTON. I think I went off one myself once back in 1949, with Captain Chick Hayward, the pilot. I think that is correct.

Admiral COMBS. That is right, in a P2V with a JATO assist.

Senator SYMINGTON. Have you a plane to replace the P2V that will get back on a carrier?

Admiral RUSSELL. That is the S2F, sir, the one you saw before. That is the single package carrier based anti-submarine aircraft.

AIRCRAFT RANGES

Senator SYMINGTON. And from the standpoint of the problem of how to defend the United States against long-range missiles slung in from submarines, that airplane should have about as high priority as anything?

Admiral COMBS. That one along with the P2V which you saw and also the P5M.

Senator SYMINGTON. A P2V that can land on a carrier can have a much better radius situation than one that cannot, isn't that right?

In other words, what I am trying to say is what you can keep out there working with the carriers is very important from the standpoint of——

Admiral RUSSELL. These have made 11,000 miles in nonrefueled flight. (D)

Senator SYMINGTON. I understand that.

We had a briefing from Admiral Clark, is that right?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. In which he showed the possibilities, I believe, of the Regulus, for example, from a submarine deck. (D)

Admiral COMBS. Yes, sir.

Senator SYMINGTON. It made a great impression on me. And what I am thinking about is the maximum utilization of everything you can in order to prevent that happening.

There is an airplane that does not have to come back, a pilotless missile.

Admiral RUSSELL. The P2V was designed to work over its assigned piece of the ocean which is just about halfway across.

On overseas bases they could cover the other half.

Senator SYMINGTON. It is a very long-range airplane.

When you say 14 hours—wasn't that the figure given.

Admiral RUSSELL. Standard mission, yes.

Senator SYMINGTON. Yes.

Admiral COMBS. Throw that P2V back on the screen. It was 12 hours.

There was one shown with 14.

That was the seaplane P5M.

Senator SYMINGTON. Twelve hours at 170 knots, that could be better if you could get one better from the standpoint of patrol off the land.

CREW FATIGUE: A LIMITATION

Admiral COMBS. As we mentioned here a little bit ago, the ideal would be the nuclear-powered airplane.

The only limit would then be the human endurance, if we could get that.

Senator SYMINGTON. If you get into an atomic plane, then the problem is crew fatigue.

Admiral COMBS. Yes, sir.

Admiral DAVIS. Mr. Chairman, the efficiency of a radar observer after two hours goes way down.

You have to keep circulating them on the scopes. You cannot keep people out indefinitely on that type of search.

I am speaking of these planes watching their radars and scopes in their search for submarines and the magnetic types of detectors; you cannot keep them on the job too long.

SUBMARINE DETECTION

Senator SYMINGTON. I would like to be sure to understand it.

Can you detect a submarine under the water?

Admiral DAVIS. That point out of the tail detects variations in the magnetic field of the earth caused by the hull of the submarine under water.

Senator SYMINGTON. Do you do that on the radar scope?

Admiral DAVIS. It is done on a scope but not the same kind. The radar is under the belly of the airplane.

Senator SYMINGTON. I understand that, but the same fatigue comes to the man who is working on that instrument in the back?

Admiral DAVIS. Yes, sir.

Senator SYMINGTON. That is what I was trying to get at. The fellow who is working to detect an underwater job has the same fatigue problem as the fellow working on a straight surface radar screen?

Admiral DAVIS. That is right, yes.

Senator SYMINGTON. What do you do in a case of that character where you are on a relatively long-range mission?

Do you carry more than one?

Admiral COMBS. Your crew carries spares.

Senator SYMINGTON. And one fellow rests?

Admiral COMBS. Yes, sir.

Now let's get back to slide 11–G.

Antisubmarine airships carry electronic and magnetic detecting equipment, and in addition, carry a sonar which, because of the airship's slow speed, can be towed through the water.

This sonar has the same advantages as those previously described for the helicopter dip sonar. Airships have another unique ability ability in that they can remain airborne for extended periods of time. This is a distinct advantage in antisubmarine operations.

MINING AND ATTACK ANTISUBMARINE FORCES

The final category in our antisubmarine forces consists of mining and attack squadrons. Attack at source, with mines or atomic weapons, is an effective means of destroying enemy submarines at their bases, as opposed to the more difficult task of seeking out and destroying them at sea. (D)

Attack carrier striking forces provide the Navy's primary weapons system of atomic attack at source.

Land and seabased squadrons will supplement the attack carriers in atomic attack. These squadrons also provide our primary mining effort.

For this type mission we require an aircraft which can deliver a substantial payload, at speeds which will provide an acceptable survival probability.

Our mining and attack squadrons are currently equipped with P2V aircraft. They will be replaced, commencing this year, with the A3D which can deliver both mines and atomic weapons. I have previously described the P2V and A3D performance characteristics.

Mr. HAMILTON. Do you get any less use fatigue on an airship?

Admiral COMBS. Not when the man is doing the same thing. When he is looking at the radarscope, it is the physical strain on his eyes.

Mr. HAMILTON. Can the airship carry a larger crew?

Admiral COMBS. They carry a good-sized crew; yes, sir. They carry extra people to stand watches on this.

Mr. HAMILTON. Might I ask a question for clarification? These aircraft now in the mining and attack squadrons, were they included within the number of aircraft you gave us earlier as constituting part of your total attack aircraft force? (D)

Admiral COMBS. Yes, sir.

Not with the attack carriers. They are separate, but there they have overall attack capability.

Mr. HAMILTON. Not included in the attack carriers?

Admiral COMBS. Not in the attack carriers, no.

Mr. HAMILTON. May I ask one further question, because I was a little puzzled?

If you made an attack upon sub pens in the event of a war, you would have available the aircraft that you mentioned as being on the CAV's; then these would be in addition to those others?

Admiral COMBS. These would be in addition to those, yes.

Mr. HAMILTON. They would be based where?

Admiral COMBS. These are normally based ashore. We could base them, since they are the same kind of airplanes, on the carriers and do a mining mission from the deck of a carrier.

Later we will start phasing the Martin P6M into our mining-attack squadrons.

This aircraft is a logical development, stemming from our long experience in seaplane operations. The mobility and flexibility of such a force is in consonance with the Navy philosophy of mounting and projecting our attack capability from the seas.

A seaplane striking force, built around the P6M, which can operate from widely dispersed, indestructible runways is a potent weapons system indeed.

These forces will have great strength in their own right and will supplement the offensive power of our carrier striking forces. Highly mobile and flexible, they will pose a genuine threat to much of the periphery of the Eurasian land mass.

Senator SYMINGTON. Are we going to get a briefing about seaplanes?

Admiral COMBS. I have another briefing to follow this, after General Salmon has talked.

Senator SYMINGTON. On the seaplane itself?

Admiral COMBS. On the P6M, on the seaplane, yes, air.

Senator JACKSON. What was the operational date, Admiral, of the first squadron of the P6M?

Admiral COMBS. We will be phasing in this aircraft in a few years. (D)

Senator JACKSON. Is this the Seamaster?

Admiral COMBS. This is the Seamaster, yes, sir.

Senator JACKSON. That is the one that blew up?

Admiral COMBS. The one that blew up and the second one is now flying. We have others on order.

They are coming along.

Senator SYMINGTON. How many have you on order?

Well, let's wait until we get into that. I am sorry. (D)

WORLD WAR II DEPTH CHARGES

Admiral COMBS. Before getting into more detail about modern antisubmarine weapons, I might return a moment to what was said previously about World War II depth charges. Twenty-five feet was the official lethal radius. I have talked to submarine officers who were in the submarine service during World War II, and that was their statement made against the Japanese depth charges which they experienced. (D)

Admiral GRIFFIN. I think in extension of that, sir, approximately 12 feet was required in order to split the hull, the pressure hull of a submarine. Twenty-five feet gave a considerable amount of difficulty.

Admiral COMBS. In many instances we believe 25 feet would shake them up to the point where they would have to surface.

It did not sink them right there at depth, but they would have to surface, which meant that they were taken over, were captured or were destroyed later. (D)

AIRCRAFT ESSENTIAL

In summing up antisubmarine warfare—the coverage of vast ocean areas depends heavily upon aircraft.

However, no one type of aircraft can fill all of the requirements. Carrier-based aircraft, helicopters, patrol aircraft, and airships, all join together under varying conditions with surface craft and submarines to defeat the enemy submarine. We have attack him at his home base, we must attack him in the narrow seas and in the open ocean areas.

SOVIET SUBMARINE THREAT SEVERE

The Soviet submarine threat is greater than any we have ever known. In order to secure shipping routes to our allies and overseas' bases, to protect our surface forces, and to protect the United States from submarine attack, we must destroy the Soviet submarine.

Senator JACKSON. Admiral, to go back there, you don't mention land-based aircraft.

Is that patrol aircraft?

Admiral COMBS. Yes, sir, patrol aircraft.

Senator JACKSON. Patrol aircraft would be land based?

Admiral COMBS. Yes, sir. It could be seaplanes, sea based, the two types, P2V and P5M.

Senator JACKSON. As you were summing up, I went through the list, and you did not mention land based along with the others.

Admiral COMBS. The patrol aircraft are the two types.

Senator SYMINGTON. Admiral, this has been an extremely interesting briefing. We have held you up at least 15 minutes, if not more, with our questioning. You have been going for a couple of hours. Do you want to try to finish tonight?

I told Senator Duff we would stop at a quarter after 5 at the latest because he has a date.

What would you like to do?

Admiral COMBS. It is whatever you want, sir.

If you want to continue on——

Senator SYMINGTON. It is your pleasure.

You have been very patient with us.

Admiral COMBS. If you want to continue on until I have finished, that would be agreeable with me.

Senator SYMINGTON. What would you like to do?

Admiral COMBS. Continue, if you please.

NAVY'S CONTRIBUTION TO CONTINENTAL AIR DEFENSE

I will next cover the Continental Air Defense.

You have already received, I know, a description of the problems of Continental Air Defense from the Air Force. I will here just mention the Navy's participation in this important endeavor. Figure 30 indicates the 3 naval aviation portions of this function. I will take up each one separately.

Our principal mission is to secure the flanks of the northern distant early warning line. This takes the form of seaward extensions in the Atlantic and the Pacific.

These extensions will be covered in a moment, but first, a word about the aircraft which we use in combination with the surface picket vessels, to make up the barrier system.

Figure 31 is the Lockheed Super Constellation configured for the early warning and control function. The search radar dome is underneath the wing. The height finding radar is on top.

The desirable features of the WV–2 are its long endurance and its ability to carry a large electronics system of radars and associated equipment. Design studies for an improved version of this aircraft are now under consideration, and I believe they will be followed in this research and development presentation which will include that. (D)

We foresee no great difficulties in providing these barriers, although the effort does absorb a large number of experienced and highly trained personnel.

The extension to seaward of the contiguous radar coverage, which is operated by the Air Force, also involves Navy participation. The Navy portion of the system is nearing completion. (D)

Naval air makes a further contribution to continental air defense in the form of emergency augmentation of the continental based interceptor forces, with such of our fighter aircraft as may be available at the time. This program is a good example of effective liaison with the Air Force. It is already on a daily working basis.

In San Diego, we have by agreement with the Air Force, taken over the complete fighter defense of that area.

I have covered in some detail the organization and capabilities of our various units, with particular emphasis on the attack carrier and air antisubmarine forces. There are many other chapters in the naval aviation story. I will now mention a few of them.

We are prepared to exploit our supremacy at sea in many ways. By amphibious operations we are able to project our power ashore, in critical areas, and at critical times. General Salmon will cover this matter more thoroughly, but just now I want to bring out the fact that naval and Marine aviation is a most essential part of the amphibious teams.

Naval and Marine squadrons are prepared to accomplish all the necessary requirements of tactical air warfare in support of the surface forces. This will, of course, include the helicopter air lift required for the vertical envelopment concept.

COLLATERAL FUNCTIONS OF NAVY

In addition to basic naval tasks, which I have described, there are certain collateral functions which have been assigned to the Navy in support of other services. Important among collateral tasks of naval air is the requirement to assist in the prosecution of the land battle; in other words, to support our ground forces. An excellent sample of this is the Navy's air effort in Korea where some 300,000 sorties were flown in support of U. N. ground forces.

NAVY'S RESEARCH AND DEVELOPMENT PROGRAM

We are not unmindful of the responsibilities we now have for the future combat readiness of the fleets. We are providing for the future material readiness of the Navy with our varied program of research and development.

The dominant features of this program are:

1. Provision of nuclear power for ships and aircraft;
2. Improvement of our all weather atomic and nonatomic delivery capabilities, with carrier-based planes;
3. Increased effectiveness of air defense against high performance attack systems;
4. Increased effectiveness in antisubmarine warfare; and
5. Further exploitation of electronics in aircraft and guided-missile control, target detection and surveillance, and electronic countermeasures.

We have made real progress since World War II in improving our naval weapon systems. We expect that even greater advances in Navy capabilities will be achieved in the near future.

NAVY'S PERSONNEL PROBLEMS

No discussion of capabilities would be complete without some reference to personnel and training. I am aware that in previous testimony, before this committee, the personnel problems of the services have been touched upon. A representative of the Chief of Naval Personnel will discuss Navy personnel matters in detail.

However, I believe that I should mention this subject particularly as it affects naval aviation readiness. The basic problem is the high turnover rate. One hundred percent personnel readiness is a goal that is seldom achieved by any military unit.

We expect a degree of attrition in all of our ranks and ratings, and our aviation training facilities are charged with replacing these losses. Figure 33 will show you the size of our training program.

Our training facilities consist of 2,500 aircraft, 57 technical schools, and 79 mobile trainer units.

We are training at an annual rate of 3,300 pilots, and we have about 91,000 graduations from our aviation technical schools and mobile trainer units per year.

This training rate is actually higher than we consider economical or efficient for our current strength level. The high training rate you see here is not the whole answer to our problems. It does not solve the abnormally high turnover rate or improve the experience level in our squadrons.

Too many of our enlisted men and young officers who are highly trained find life outside the service more attractive and are leaving the Navy at the end of their obligated service. This high attrition is hard to live with and will, if it continues, result in reduced combat readiness.

The everincreasing complexity of modern aircraft demands an increasingly high level of skill and experience for both pilots and technicians. Our real need is not for a higher training rate but for the retention on active duty of our enlisted petty officers and young aviation officers for increased lengths of service.

We are making progress in overcoming this problem, however, I will leave details for presentation by the Chief of Naval Personnel representative.

It has been my privilege, gentlemen, to show you the role of naval air power in our Navy today.

VARIETY OF NAVY TASKS

I have endeavored to lay stress upon the wide variety of tasks which our forces are called upon to perform; attack—from light to heavy—antisubmarine warfare—mining—protection of shipping—amphibious operations—support of the ground forces—continental defense, and the correlation of our efforts with those of our sister services.

In outlining our various tasks, I have shown in some detail the tools we work with in performing those tasks. Our carriers, our various airplane types, and a family of weapons ranging from conventional to high yield, thermonuclear.

Early in my discussion you were shown the attack capability of various aircraft types. Figures 34 through 36 will, I believe, give you a more comprehensive picture of this subject.

ATOMIC WEAPON CAPACITY

Figure 34 shows, in the upper portion, our total atomic weapon dispersal capacity afloat as of July first of this year.

Senator SYMINGTON. Do you want this on the record?

Admiral COMBS. Yes, sir.

This is capacity.

That is, we have the physical facilities in our ships to handle this number of weapons if allocated. (D)

The next chart shows our present delivery capabilities. It covers our stable of atomic delivery aircraft: propeller planes, jet light attack planes, and heavy attack planes. (D)

The following chart shows what our capabilities will be in 1959. You will note the expected improvements. (D)

GEOGRAPHY

Mr. HAMILTON. Would you identify that position?

Admiral COMBS. That is right off the coast of Norway, a little.

Mr. HAMILTON. Approximately how far would that be offshore? (D)

Senator JACKSON. Opposite what city in Norway?

Admiral COMBS. Bodo, I guess.

Senator JACKSON. Bodo is a little above the Arctic Circle.

Admiral COMBS. That is a question I cannot answer.

Senator JACKSON. My mother was born there, so I know.

Admiral COMBS. That is a pretty rugged place in the wintertime, they tell me.

Senator SYMINGTON. He is a pretty rugged Senator.

Will you proceed, Admiral. (D)

VERSATILITY AND MOBILITY OF TASK FORCE

Admiral COMBS. Now let me invite your attention to another significant feature. The black dotted line represents the locus of the distant points which the task force could have occupied just 24 hours before reaching the launching point.

In other words, we have here a vast sea area any part of which the task force might have been in during the preceding 24 hours.

I believe you can appreciate the enemy air effort which would be required just to effectively search out this area and to precisely locate the task force therein.

I sincerely trust that my presentation has brought to you an appreciation—an accurate measure, if you will, of the valuable capabilities which are inherent in these forces, when viewed in their aggregate.

In conclusion, let us look briefly at some principles—principles of warfare as they relate to seaborne-naval airpower.

The sea is the element which provides us with vast breadth of base from which to mount the attack.

At sea, our carriers are in fact dispersed mobile airbases, practically immune to attack by long-range ballistic missiles.

Having mobility, we automatically inherit a certain amount of flexibility—that is we have a number of avenues of approach to the job. We need not necessarily enter by the front door. We may elect to go in at the back or on the side.

And lastly, the principle of versatility. Because of our wide range of capabilities, we have choice as to how we will accomplish the job.

We may be called upon to pick the lock, but, if need be, we can batter down the door.

That concludes my statement.

APPRECIATION

Senator SYMINGTON. Thank you, Admiral. That is one of the finest organized briefings I have ever had the privilege of listening to.

Before we recess until 10 o'clock tomorrow, I ask this question.

Do you believe it would be more constructive for us to continue to listen to these future briefings before we ask questions; or ask them against your briefing?

My guess would be we ought to hear the briefings through.

Admiral COMBS. I would ask that, sir, because there are things which come in these other three, and they are comparatively short; the general's presentation is 15 minutes and I have one 10-minute for the P6M and one 10 minute for the airlift.

Senator SYMINGTON. We will recess until 10.

Senator DUFF. I would like to say for the record before you close I think this presentation was spectacularly effective.

Admiral COMBS. Thank you, sir.

Senator JACKSON. I want to compliment the Admiral, too.

I have not had a chance to read it all yet, but from what I heard, it is very good.

Will there be a briefing as to the Navy's employment of the IRBM No. 2, how you propose to use it?

Admiral COMBS. Not so far.

Wasn't that covered by Admiral Clark?

Admiral GRIFFIN. We did not have such a briefing prepared; no, sir.

Senator JACKSON. I notice it was left out here on page 36 where you listed all these things under research and development.

Admiral COMBS. I mentioned at one point that Admiral Clark had given our missile presentation already.

Senator SYMINGTON. When we get into the questioning you will have Admiral Clark?

Admiral COMBS. Yes, sir; I have one of his representatives here right now.

Senator SYMINGTON. These questions will come up on the missile.

Admiral COMBS. I have a missile expert all the time, sir.

Senator SYMINGTON. Tomorrow we will meet in room 457.

Admiral COMBS. Will we be allowed to put one of our projectors in room 457?

Senator SYMINGTON. Yes, indeed.

Senator JACKSON. Mr. Chairman, I understand from counsel that the matter was previously presented, so there is no need to duplicate it on the IRBM.

I could not be here at the time, but if it has been presented——

Senator SYMINGTON. I think it has.

It is a very fine briefing.

Senator JACKSON. I do have some questions I would like to ask about it because the Navy can make very good use of it.

(Whereupon, at 5:20 p. m., the committee was adjourned, to reconvene at 10 a. m. Friday, June 1, 1956.)

STUDY OF AIRPOWER

FRIDAY, JUNE 1, 1956

UNITED STATES SENATE,
SUBCOMMITTEE ON THE AIR FORCE,
OF THE COMMITTEE ON ARMED SERVICES,
Washington, D. C.

The subcommittee (consisting of Senators Symington, Jackson, Ervin, Saltonstall, and Duff) met, pursuant to recess, at 10:05 a. m., in room 457, Senate Office Building, Senator Stuart Symington (chairman of the subcommittee) presiding.

Present: Senators Symington (presiding), Jackson, and Duff.

Also present: Fowler Hamilton, general counsel; Ramsay D. Potts, Jr., associate general counsel; Fred B. Rhodes, legal consultant to Senator Saltonstall; Edward C. Welsh, assistant to Senator Symington; and Wallace L. Engle, staff member.

Brig. Gen. Thomas C. Musgrave, Jr., USAF; Lt. Col. Donald S. Bussey, OCSOPS DA; Brig. Gen. Ronald D. Salmon, USMC; Assistant Director, Division of Marine Aviation, Office of Chief of Naval Operations; Comdr. S. H. MacGregor, Jr., Comdr. J. F. Schremp, JAG; Captain Robertson, Captain Massey, Captain Outlaw, Comdr. J. S. Elkins, Comdr. M. E. Haller, Rear Adm. J. S. Russell, Comdr. W. W. Suydam, Comdr. M. F. Weisner, Comdr. R. E. Warner, Comdr. R. D. Macklin; Capt. S. R. Brown, Rear Admiral Griffin, Vice Admiral Combs, Capt. J. S. McCain, Capt. D. L. Martineau, Rear Adm. W. V. Davis; Capt. S. S. Searcy, Capt. F. A. McKee, and Y3c. J. G. Murchek; Jack L. Stempler, Assistant General Counsel, Department of Defense; Clarke A. Morgan, OSD, Security Office; Bernard S. Bogdanowicz, OSD, Security Office.

Senator SYMINGTON. This subcommittee of the Senate Armed Services Committee will now come to order.

Admiral, will you consider yourself sworn?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. And will all those also who were with you yesterday consider yourselves sworn. Is there anybody else who will testify today who has not been sworn?

Admiral COMBS. I have two officers, sir.

Senator SYMINGTON. Will they testify this morning?

Admiral COMBS. They may on details of certain areas.

Senator SYMINGTON. Will you come forward?

Gentlemen, will you identify yourselves for the record?

Commander MACGREGOR. I am Commander MacGregor of the office of the Chief of Naval Operations.

Commander MACKLIN. I am Commander Macklin, Office, Chief of Naval Operations.

Senator SYMINGTON. Will you raise your right hands, please.

Do you solemnly swear that the information you give the Subcommittee on the Air Force of the Senate Armed Services Committee will be the truth, the whole truth, and nothing but the truth, so help you God.

Commander MACGREGOR. I do.

Commander MACKLIN. I do.

Senator SYMINGTON. Admiral, what is your pleasure?

Admiral COMBS. This morning, sir, with your approval we would like to start with General Salmon, with the Marine Presentation, which follows my own.

Senator SYMINGTON. Yesterday you gave us this fine book to follow.

Have you anything for us to look at this morning?

Admiral GRIFFIN. I think you have it. Yes, sir, that is it.

Senator SYMINGTON. General, we look forward to this presentation. At this point in the record, I would like to insert a résumé of your background and experience.

BRIG. GEN. RONALD D. SALMON, USMC

Brig. Gen. Ronald D. Salmon, United States Marine Corps, is a 1930 graduate of the United States Naval Academy and a naval aviator since 1932, who holds two Legions of Merit, the Bronze Star, and Air Medals for service in World War II and Korea. Now serving as Assistant Director, Division of Aviation, Headquarters, United States Marine Corps, and in the Office of the Chief of Naval Operations. His service includes duty on the early aircraft carriers *Langley*, *Lexington*, *Saratoga*, and *Ranger*. In World War II he commanded the first medium-bomber squadron (PBJ nee Mitchell Bomber) of the Marine Corps in action in the Solomons; in the South Pacific he also commanded the 2d Marine Aircraft Wing for a 6-month period as task unit commander of all land-based naval and marine aircraft in New Caledonia, New Hebrides, Fiji, and Samoan areas. He served with the 2d Marine Aircraft Wing as G–3 during the Peleliu operation, and with this Wing in the Okinawa operations.

In 1944–45 General Salmon served in Hawaii as G–3 of Aircraft, Fleet Marine Force, Pacific, and as G–1 of that command. He graduated from the Naval War College in 1948 and served as commander of Marine Aircraft Group 15 in Hawaii from 1948 to 1949. Following this command assignment he served in the Strategic Plans Division of the Office of the Chief of Naval Operations until 1952 when he was assigned as special weapons plans officer on the staff of the commander in chief, Naval Forces, Eastern Atlantic and Mediterranean. During the period 1952 to 1953 he also served on the Air Staff of the Supreme Headquarters Allied Powers Europe under General Norstad. From 1953 to 1954 General Salmon served in the 1st Marine Aircraft Wing in Korea as G–3 and as wing service group commander, returning to duty in Headquarters Marine Corps in 1954.

Born in Pittsford, Mich., April 7, 1909, General Salmon entered the service on June 14, 1926, and was commissioned a second lieutenant on June 5, 1930, from the United States Naval Academy.

Senator SYMINGTON. Will you proceed, General?

TESTIMONY OF BRIG. GEN. R. D. SALMON, UNITED STATES MARINE CORPS

General SALMON. Mr. Chairman and members of the committee, the primary requirements of Marine Corps aviation are derived from the legal responsibilities of the Marine Corps. Specifically and briefly stated these are:

FUNCTIONS OF MARINE AVIATION

To provide Fleet Marine Forces of combined arms, together with supporting air components, for service with the fleet in the seizure or

defense of advanced naval bases and for the conduct of such land campaigns as may be essential to the prosecution of a naval campaign.

Marine aviation as the supporting air component of the Fleet Marine Forces performs four essential tasks. These tasks and the concept for their performance stem from a long period of development based upon and influenced by experience gained in battle.

They are as follows:

DIRECT SUPPORT

1. Direct support operations: We must provide direct air support of ground forces by attacking and destroying enemy installations, equipment, supplies, and personnel.

These operations employ ground and airborne equipment in the seizure and defense of landing force objectives and are conducted in the geographical objective area of the amphibious task force. The operations include close and intermediate air support for the landing force, and direct support of vertical envelopment operations through the neutralization and protection of landing zones and the routes of ingress and egress. (D)

In their performance of direct support operations for the landing force they will normally operate over a combat radius of about 300 nautical miles with approximately ——— pounds of external ordnance stores for the A4D jet and about 7,000 pounds for the AD propeller aircraft. (D)

Senator SYMINGTON. What is "external ordnance stores"? What is the definition?

General SALMON. Those are the bombs that are carried externally to the airplane rather than inside of a bomb bay.

Senator SYMINGTON. How many of these planes are in a squadron?

General SALMON. Twenty four, sir.

Senator SYMINGTON. Twenty-four in a squadron.

So your squadron is roughly comparable in size to the Air Force squadron?

General SALMON. Yes, sir.

Senator SYMINGTON. Finally, the A4D is a jet?

General SALMON. A jet aircraft.

Senator SYMINGTON. And the AD is a piston?

General SALMON. Piston aircraft.

SATISFIED WITH RATE OF AIRCRAFT PHASING

Senator SYMINGTON. If you had your way would you prefer to have all jet or would we get into this question of slow speed for support here also?

General SALMON. As we gradually progress into the vertical envelopment we must at the same time keep our readiness up, Mr. Chairman, and the AD for something less than nuclear war is a terrific ordnance carrying aircraft.

The AD6 carries 12,000 pounds of bombs.

Senator SYMINGTON. To be sure I understand, you are satisfied with the rate of replacement that gives you this position by the end of the fiscal year 1958, from the standpoint of modernity.

General SALMON. Yes, sir. Both of these.

Senator SYMINGTON. What is the crew on these ships?

General SALMON. The crew on the AD at the present time is 1, 1 pilot, sir.

Senator SYMINGTON. And on the A4D?

General SALMON. One pilot, sir.

Senator SYMINGTON. Then he fires the four 20 millimeters.

General SALMON. Yes, sir; they are regular, fixed guns.

Senator SYMINGTON. The same man fires that flies; right?

General SALMON. Yes, sir.

Both of these aircraft are equipped with four 20-millimeter guns and have the capability of carrying conventional ordnance or special weapons appropriate to tactical support operations.

ASSAULT AIR TRANSPORT

2. Assault air transport operations: To provide air transportation for personnel, equipment, and supplies, including air evacuation and air drop of supplies, by both fixed-wing and rotary-wing aircraft.

The concept for vertical envelopment assault by the landing force envisions the employment of rotary wing aircraft for the transportation of the landing force. The assault resupply of material by helicopter is to be augmented by fixed-wing transport aircraft providing air drop or air landed resupply of combat cargo for the operation.

By the end of fiscal year 1958 Marine aviation will have made substantial progress toward the attainment of the vertical envelopment concept. The squadrons will be equipped with HRS, Sikorsky, HUS, Sikorsky, and with HR2S type helicopters. (D)

Senator SYMINGTON. Please describe those ships.

General SALMON. HRS is a small helicopter we are presently equipped with which carries a payload of about 1,500 pounds.

The HUS helicopter is the transport version of the Navy HSS helicopter. It is a larger helicopter and has a payload in our configuration of around 3,600 pounds.

HR2S is a large twin-engine helicopter now being delivered. It has a payload of around 4,200 pounds.

SATISFIED WITH RATE OF HELICOPTER DELIVERIES

Senator SYMINGTON. You say by the end of fiscal year 1958?

General SALMON. Yes, sir; we will have by that date about three-quarters of those programed. (D)

Senator SYMINGTON. Are you satisfied with that?

General SALMON. It is as fast as we can take them, sir. (D)

When we go into the vertical envelopment the complement of those squadrons which is now 15 will go to 20, so we get a compartmented task group.

Senator SYMINGTON. What about the HUS?

General SALMON. HUS starts delivery shortly after Christmas this year.

Senator SYMINGTON. Shortly after Christmas of this year?

General SALMON. Yes, sir.

Senator SYMINGTON. That might almost be next year?

General SALMON. Yes, sir; this next fiscal year we start getting into it.

Senator SYMINGTON. How about HR2S?

General SALMON. That starts delivery in September.
Senator SYMINGTON. This September?
General SALMON. This September.
Senator SYMINGTON. Thank you.

FUTURE LIFT CAPABILITY

General SALMON. This will provide us in a few years with the capability of a total simultaneous lift for a 50-nautical mile radius of the equivalent of approximately 300 tons. (D)

The fixed wing component of Marine aviation is equipped with R4Q or, as called in the Air Force, C–119, and with the R4D aircraft, similar to the C–54. (D)

TACTICAL RECONNAISSANCE

Our third task is tactical reconnaissance operations: We must provide the landing force with visual, photographic, and electronic reconnaissance.

In the field of visual reconnaissance Marine aviation has observation squadrons equipped with rotary wing and fixed-wing aircraft. (D)

These units provide visual reconnaissance in the immediate landing force objective area and perform collateral duties, such as aerial spotting for artillery and naval gunfire, smoke laying illumination, wire laying, liaison, courier service, and such other miscellaneous operations as may be feasible.

The squadrons are equipped with HOK type helicopter and OE fixed-wing aircraft.

This, to describe it, is the double rotar helicopter that impinges on itself, counter rotating helicopter, and OE fixed-wing aircraft—Army observation aircraft.

Senator SYMINGTON. What aircraft is that?
General SALMON. The OE?
Senator SYMINGTON. Yes.
General SALMON. It is a high wing small observation aircraft.
Senator SYMINGTON. It is a puddle jumper?
General SALMON. A puddle-jumper aircraft.

The normal combat radius of action of these aircraft is 50 miles.

The tasks of photographic and electronic reconnaissance are performed by composite squadrons consisting of photographic and electronic aircraft. (D)

These are equipped to provide combat intelligence to the amphibious force in the objective area by photographic and electronic means.

Each of these squadrons is programed for F9F Grumman jet photographic aircraft with a normal combat radius of 300 miles and F3D Douglas electronic aircraft with approximately the same radius.

Senator SYMINGTON. Are these additional airplanes in the squadrons or are they additional squadrons?

General SALMON. These are separate squadrons, the composite squadrons.

Senator SYMINGTON. Each of these squadrons you have composite squadrons, is that it? (D)

General SALMON. Yes, sir; composite squadrons, and observation squadrons. (D)

Senator SYMINGTON. And they have 18 aircraft in them apiece?

General SALMON. Yes, sir.

Senator SYMINGTON. And what is the F9F6?

Has that a comparable Air Force model?

General SALMON. F9F6 is a Grumman Cougar with a photographic nose on it. It is not used in the Air Force.

F3D is a Douglas night fighter aircraft that is being converted to electronic countermeasures.

Senator SYMINGTON. Thank you.

COUNTER AIR OPERATIONS

General SALMON. The fourth task, is counter air operations.

We must provide an integrated air defense for direct support of the landing force in the land war extension of the amphibious task force objective area.

The system must have the capability of local air defense of the landing force.

The complexity of amphibious operations requires that the amphibious task force commander must be vested with unrestricted operational command over all air operations within the amphibious task force objective area upon the commencement of operations.

As the operation progresses, the tempo of air defense operations must increase to provide complete protection of the landed troops at their objective as well as the fleet at sea.

In the final phase of the operation upon commencement of withdrawal of the fleet, the landing force must have the capability of air defense of the seized objective by its land based air component.

This is a part of the orderly transfer of combat power, both ground and air, from sea to land which is the broad purpose of the amphibious operation.

MARINE AIR DEFENSE CAPABILITIES

This does not imply that Marine aviation provides adequate air defense for self-sufficiency in an amphibious operation. Rather it is to be correlated with and responsive to the requirements for the overall air defense with particular responsibility for local air defense of the landing force objective.

I might explain this just a little more fully.

In general, a conventional air-defense system involves operations in three areas: First, there is the vital area where the landing force and the amphibious forces operate.

Second, there is the area of interdiction, which is the area surrounding the vital area and in which the enemy air attacks must be defeated or turned back.

And third, there is the area of surveillance which is extended outward from the vital area and the area of interdiction.

Marine aviation is not large enough, nor is it equipped to, nor does it intend to provide all the units necessary to an air-defense system such as I have just described.

It is organized to participate in such a system.

Marine aviation units are organized, trained, and equipped to effect deployment ashore with the landing force and carry out their responsibilities.

In the execution of this task, Marine aviation is programed for an equal number of all-weather fighter aircraft and day interceptor aircraft. (D)

These squadrons are to be scheduled to be equipped with the F8U, the F4D, and the FJ–4 types of aircraft as they become available.

Mr. HAMILTON. Pardon me, may I raise a question for clarification? Are those squadrons likewise composed of 24 aircraft?

General SALMON. Twenty-four aircraft each.

Mr. HAMILTON. Are you talking now about the future program instead of the programs now in operation?

General SALMON. The program in fiscal year 1958.

Senator SYMINGTON. As long as counsel brings that up, what is the F8U?

General SALMON. The F8U is the same aircraft that is operated by the Navy, sir.

Senator SYMINGTON. And what is that?

General SALMON. It is the Chance Vought new high-wing aircraft, Crusader.

Senator SYMINGTON. Is that that very fast plane we saw?

Admiral COMBS. It is; yes, sir.

Senator SYMINGTON. Supersonic? (D)

General SALMON. Yes, sir.

Senator SYMINGTON. What is the F4D?

General SALMON. Douglas delta wing aircraft that established the recent speed record.

Senator SYMINGTON. And FJ–4?

General SALMON. That is the development of the North American Sabre.

Senator SYMINGTON. That is a projection of the F–86.

General SALMON. Yes, sir.

Senator SYMINGTON. Are all these planes capable of taking off from carriers?

General SALMON. Yes, sir.

Senator SYMINGTON. They are built the same as the Navy?

General SALMON. Yes, sir; identical aircraft to the Navy's.

Senator SYMINGTON. Pardon?

General SALMON. Identical aircraft to the Navy's, sir.

Senator SYMINGTON. Does that hold true for all your planes?

General SALMON. All of our aircraft, sir.

Senator SYMINGTON. And finally, how many squadrons in total have you got?

General SALMON. Combat squadrons, 27 squadrons.

Senator SYMINGTON. How many?

General SALMON. Twenty-seven combat squadrons.

Senator SYMINGTON. Twenty-seven. Does that in effect mean nine wings or do you cut them into squadrons?

General SALMON. No, that in effect means three wings. We have nine squadrons in each wing.

Senator SYMINGTON. You have nine squadrons?

General SALMON. Nine squadrons in each wing.

Senator SYMINGTON. Thank you.

General SALMON. That is in addition to the reconnaissance aircraft and the transport. (D)

MARINE AVIATION TO RETAIN "A BALANCED POSTURE"

The postulates for Marine aviation demand that it be organized, trained, and equipped to provide the Fleet Marine Forces with the optimum supporting air component required for the accomplishment of its assigned missions, with the minimum equipment.

In this regard no increases in aircraft operating program are envisaged as the Marine Corps progresses toward the vertical-envelopment concept employing helicopters.

As the helicopter program is increased the squadron complements will reflect a compensatory reduction.

This is made possible by increased performance and combat capability of the new equipment in these fields.

Marine aviation will retain a balanced posture to perform its assigned functions.

NUMBERS OF MARINE AIRCRAFT

Now, of the 1,424 aircraft programed, 1,230 are in the combat category, performing the various functions noted on the slide.

The 1,230 combat aircraft are divided equally between our 3 functional Marine aircraft wings. These wings are always based near the major Marine ground combat units. (D)

Our Marine aircraft wings are trained, equipped and packed up, ready for immediate deployment, ready for sustained combat operations at a moment's notice.

The direct support aircraft are used for specialized instrument training, fighter training, attack training, and helicopter training.

The indirect support aircraft are those that are assigned to our bases for administrative and logistics purposes.

NUMBERS OF MARINES

Senator SYMINGTON. You mentioned three divisions. How many divisions have the Marines?

General SALMON. Three divisions, sir.

Senator SYMINGTON. How many men in each division?

General SALMON. Roughly in a combat division around 22,000.

Senator SYMINGTON. Around 22,000?

General SALMON. 22,000 men, sir.

Senator SYMINGTON. Thank you.

What you really do is put an air wing in support of each of your divisions?

General SALMON. Yes, sir; that is right.

STATUS IN FISCAL YEAR 1958

Now as the new equipment becomes available and as we progress farther in our vertical envelopment concept, the composition of Marine Corps aviation will change.

The number of rotary-wing squadrons will increase and other squadrons will be altered, in order to maintain a balanced force capable of performing our tasks with maximum efficiency.

This slide shows aircraft types to be assigned marine attack and fighter squadrons by 1958, with their armament.

Senator SYMINGTON. You constantly refer to 1958.

Why is that such an important date?

General SALMON. The reason we refer to that, Mr. Chairman, is that in 1958 we will see the result of today's procurement.

Senator SYMINGTON. You are talking about the end of fiscal year 1958?

General SALMON. Yes, sir.

Senator SYMINGTON. That would really be a year from next month; wouldn't it?

General SALMON. That is right, sir.

Senator SYMINGTON. And so all this is going to happen in the next 13 months?

General SALMON. In the next 13 to 18 months.

Senator SYMINGTON. Thirteen to 18 months?

General SALMON. Yes, sir.

Senator SYMINGTON. Your lead time took longer than that.

General SALMON. Well, most of these aircraft we are now receiving in small increments as we convert.

Senator SYMINGTON. It would be the end of 1958?

General SALMON. Fiscal year 1958, sir.

Senator SYMINGTON. Then it would be 2 years from now?

General SALMON. Two years from now, 24 months from July.

Senator SYMINGTON. Thank you.

SMALL FORCE WITH POTENT PUNCH

General SALMON. As for these aircraft, Admiral Combs described most of the airplanes in his presentation.

They are all carrier types identical to those used by Navy squadrons. All are equipped with guns and some will also carry air-to-air missiles. (D)

Twenty squadrons can carry conventional bombs and rockets, and 12 of these can also carry special weapons. (D)

As you can see, this small force carries a potent punch which is to support a marine air-ground force, and to complement the Navy carrier squadrons or to augment an overall air effort.

Now this slide shows the lift capability of Marine Corps aviation as we progress toward the vertical envelope concept.

In the next 2 years, our helicopter lift will increase considerably. In succeeding years, with additional helicopters available the number of fixed-wing transport aircraft will be reduced.

MARINE AVIATION PART OF NAVY AVIATION

In closing I would like to reiterate that Marine Corps aviation is a component part of naval aviation, that it is designed, trained, and equipped to perform necessary portions of the assigned Navy missions.

Marine aircraft from design to scrap heap are an integral part of the Navy's program.

Budgeting, procurement, maintenance, and supply are carried out by the various bureaus of the Naval Establishment for the entire Navy and Marine Corps.

Marine Corps aviation is a necessary part of a large Navy team; it is especially trained and ready, it is ready to support a highly

critical and vital phase of naval warfare, but it is also capable of complementing other forces when the need arises.

CHRONOLOGICAL PICTURE OF MARINE AIRCRAFT

Senator SYMINGTON. Thank you, General.

For the record at this point will you put in the type and character of aircraft you have had in each of these squadrons for the years 1952, 1953, 1954, 1955, 1956, and 1957?

General SALMON. Yes, sir.

Senator SYMINGTON. And also 1958.

Inasmuch as you talked about what was available by the end of the fiscal year 1958, we will carry it up to that fiscal year.

General SALMON. Yes, sir.

(The information requested has been supplied to the committee in classified form.)

Senator SYMINGTON. Mr. Counsel, have you any questions?

Mr. HAMILTON. Yes, I have a few I would like to ask the general.

MARINE AIRCRAFT MOVED BY CARRIERS

General, you made the point in the course of your presentation that Marine aviation was integrated, so to speak, capable of integration with naval aviation.

In that connection, I should like to ask you how Marine aviation gets from place to place.

Suppose war broke out and you wanted to shift some of your squadrons from one place to another over a longer area than they could fly.

Would they be transported on carriers?

General SALMON. Yes, sir.

Mr. HAMILTON. Then to that extent would they absorb the carrier capacity that Admiral Combs has talked about?

General SALMON. During the transportation phase, although they would be capable of fighting on the carrier while they were being moved.

Mr. HAMILTON. Just as though they were naval air?

General SALMON. Yes, sir.

NO REFUELING CAPACITY IN MARINE AVIATION

Senator SYMINGTON. In the Tactical Air Command there is some, not much, but some refueling capacity for their fighters.

Have you any refueling capacity in the Marine Corps?

General SALMON. Not at the present time, sir.

We will have when we get the refueling aircraft in the Navy.

Senator SYMINGTON. You should have, shouldn't you?

General SALMON. Yes, sir.

Senator SYMINGTON. You would be much more mobile?

General SALMON. We will have the same refueling capacity that the Navy-type aircraft gives us when we receive it.

Senator SYMINGTON. What is that plane?

General SALMON. FJ4 and the F8U and the A4D have refueling capability.

Senator SYMINGTON. Which plane would you use as a tanker?

NO ADDITIONAL PLANES FOR REFUELING PLANNED

General SALMON. Using the Buddy system we will use an attachable pod to refuel the aircraft.

Senator SYMINGTON. You would have some of the same planes in the Buddy system instead of a special plane like a C–97 or a KC–135 as a tanker, is that right?

General SALMON. Yes, sir.

Senator SYMINGTON. You have programed that?

General SALMON. The Buddy system tanker?

Senator SYMINGTON. Right.

General SALMON. Yes, sir.

Senator SYMINGTON. Will those planes that you utilize in the Buddy system be in addition to the planes that——

General SALMON. No, they will be the same aircraft.

Senator SYMINGTON. The same aircraft?

General SALMON. Yes, sir.

Senator SYMINGTON. So to the extent that you need them for tankers, they attenuate your strike potential, don't they?

General SALMON. That is right, sir.

Senator SYMINGTON. A plane equipped to be a tanker does not necessarily have to be a tanker under the Buddy system?

General SALMON. No, sir.

Senator SYMINGTON. You can use it as a fighter?

General SALMON. It is a parasite equipment that you can drop.

Senator SYMINGTON. So how many you use as a tanker will depend upon the mission in question, is that right?

General SALMON. Yes, sir.

MORE RE TRANSPORTATION OF MARINE AIRCRAFT

Admiral COMBS. Mr. Chairman, may I make one comment on the transportation of the Marine aircraft on aircraft carriers?

Those Marine aircraft need not necessarily be transported in our attack carriers.

We have the small carriers, what we call the Jeep carriers, which have been used on may, many occasions to transport aircraft, and we would utilize them to the extent we find necessary in favor of using and tying up our attack carriers for a transportation job.

Senator SYMINGTON. Actually you could use other types of ships, too?

General SALMON. Yes, sir.

Senator SYMINGTON. To transport the planes, could you not?

General SALMON. We do have in the Military Sea Transportation Service some of those smaller carriers which are used all the time for transporting aircraft over the world.

Mr. HAMILTON. Could they be used as combat carriers, sir?

Admiral COMBS. They could not be used as combat.

Mr. HAMILTON. Could planes land on them as well as take off?

Admiral COMBS. No, sir. They would be used for transportation.

Mr. HAMILTON. Then there would have to be a field or something that you were going to before you could disembark the carrier?

Admiral COMBS. That is correct, yes, sir.

We would put them on those small carriers by cranes and take them off and put them ashore at a field and fly them to the place where they wanted to go.

Senator SYMINGTON. Pardon us for asking so many of these questions that seem elemental to you. The Chair knows a lot more about Air Force planes than he does about——

Admiral COMBS. Mr. Chairman, we are very happy to explain this. I know that our operations go on out of sight of land most of the time and nobody is particularly familiar with it.

IN FUTURE, CATAPULTING EQUIPMENT AND VERTICAL TAKEOFF

General SALMON. It might be a matter of interest to the chairman to know in addition to this capability that we have now in the immediate development stage the parts of an expeditionary catapulting arresting gear for the Marine aircraft, which avoids building these huge air fields and runways once we get into an objective area.

We have a catapult going under test and we already have an arresting gear in operation. (D)

Senator SYMINGTON. You are probably interested in vertical takeoff aren't you?

General SALMON. Yes, sir; very much so.

Senator SYMINGTON. If it really worked out, that might be a good development for a carrier itself.

Admiral RUSSELL. Yes, sir; this is an active research project of the Navy. Vertical takeoff of course is very desirable in our flying.

Senator SYMINGTON. I would think it would be desirable for all planes, wherever possible.

Senator DUFF. Very desirable in the Strategic Air Command.

Senator SYMINGTON. They would not have such a requirement for long runways.

Senator Duff, have you any questions?

Senator DUFF. No questions.

Senator SYMINGTON. Mr. Counsel?

Mr. HAMILTON. I have just one more to clarify a point with Admiral Combs; that is, the carriers you were speaking about, Admiral, are apart from the 15 attack carriers?

Admiral COMBS. Yes, sir.

TRANSPORT CARRIERS

Mr. HAMILTON. Now as to these transport carriers, did you say that the planes are lifted on to those carriers and transported and lifted off?

They don't fly on and fly off?

Admiral COMBS. They do not fly on. They do not have airmen ratings or the equipment such as catapults and arresting gear to take care of the heavy planes which they carry.

Mr. HAMILTON. They are really transport vessels or ships?

Admiral COMBS. That is correct.

Admiral RUSSELL. I would like to point out the transport carrier has the virtue of being able to transport the aircraft in flyable condition, and they can also carry a certain number of the people who would be manning these aircraft.

During World War II, we flew off replacement planes and replacement crews from these transport carriers, but we can do this no longer because of the long takeoffs required in the modern aircraft, as you can understand.

We are therefore dependent on hoisting aboard and hoisting off.

Mr. HAMILTON. They do have flight decks though?

Admiral COMBS. Flight deck, and since the aircraft goes on on its own wheels, it is ready to fly, and this is a great virtue. If you put an aircraft in a crate or even if you preserve it, it is not ready to fly when you deliver it to the theater.

Mr. HAMILTON. Thank you.

IMPORTANCE OF CONTROL OF THE AIR

Senator SYMINGTON. What you really have here is tactical support of the Marine ground forces.

Do you believe that the reason the Army has no supporting tactical wing is because of the basic difference in their mission as against the Marine Corps mission; or do you think it is just an evolution?

If you don't want to answer that, all right.

General SALMON. May I comment on it this way, Mr. Chairman: The fleet marine force is specifically designed to do one thing, and that is the landing force, and in landing force operations it is very necessary for the landing force commander to have command of all the weapons that go with his job, because time does not permit cooperation with other operations.

However, the landing force cannot go on unless you do have that cooperation theaterwise.

We are designed to give him that air weapon.

Senator SYMINGTON. But in modern war today, whether it is Army, Navy, Marines, you must control the air, must you not?

General SALMON. Yes, sir.

Senator SYMINGTON. The Army is really in just as much trouble if it does not control the air as the Marine Corps would be if it did not control the air.

It is fighting on the ground inland, isn't it, fundamentally?

I am not bringing this up for the Army to get tactical air, don't misunderstand me; nor am I in any way dissatisfied with Marine air. I think it is significant you have your own air. But I wonder what the difference is, because the Marines have done a tidy bit of fighting pretty far inland, and the Army has done a tidy bit of fighting close to the shores.

General SALMON. I would rather not comment on the Army's problems, sir.

Senator SYMINGTON. We will have people up here on policy. I was wondering why it worked out that way.

General SALMON. Our experience in the Pacific theater I think is very well defined, that the amphibious force commander and the landing force commander must have control of their weapons, whether it be naval gunfire support, rocket support or combat air support.

APPRECIATION

Senator SYMINGTON. Yes; I see that.

Thank you very much, General Salmon, for a fine briefing.

What is your pleasure now, Admiral?

Admiral COMBS. I have a short briefing on the P6M Seamaster seaplane.

The copies of my presentation are being passed around now.

Senator SYMINGTON. Are you ready?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. Fine. Will you proceed?

TESTIMONY OF VICE ADM. THOMAS S. COMBS, DEPUTY CHIEF OF NAVAL OPERATIONS (AIR) UNITED STATES NAVY—Resumed

Admiral COMBS. The Navy has, throughout the history of naval aviation, developed and operated seaplanes where there existed a military need to do so.

JET SEAPLANE

The adaptation of jet power to seaplanes showed promise of aircraft which would permit the integration of waterborne aircraft into a high performance weapon system.

Accordingly, the Chief of Naval Operations issued an operational requirement in April 1951, for a high performance all jet seaplane that would live on the water, and be supported primarily by tenders.

The Glen L. Martin Co. won the design competition and was awarded a contract to build two experimental models.

Examination of the P6M flight performance capabilities, shows a medium range aircraft, capable of operating effectively against many important targets—when logistically supported by sea. (D)

Senator SYMINGTON. May I ask what engine you use in this plane?

Admiral COMBS. Presently in this plane as it is now flying we have the J71, which is the Allison engine.

The production aircraft when they come along will employ the J75 Pratt-Whitney engine, with afterburners.

Senator SYMINGTON. What will that do to your speed?

Admiral COMBS. It will increase it just a little bit. (D)

NO SUPERSONIC SEAPLANE SOON

Senator SYMINGTON. Have you any design coming up in a seaplane which envisions a supersonic airplane?

Admiral RUSSELL. We have, yes, sir, in research and development. It is not very far along yet, sir.

Senator SYMINGTON. There would be no reason, would there, why you could not have a supersonic airplane?

Admiral RUSSELL. No, sir. We have a great number of ideas on how to enhance the performance of the more or less conventional design.

I would like to point out, Mr. Chairman, that this does not involve the area rule, the so-called coke bottling of the fuselage. This fellow has got really a bulge where it should not be and this is why he is not supersonic.

SIGNIFICANCE OF A SEAPLANE

Senator SYMINGTON. If the committee and counsel will bear with me a moment, I have been very interested in this seaplane for a long time.

General Lindbergh first interested me in it.

He is greatly impressed with its potential. It would seem to me it answers many criticisms of the carrier, and many criticisms of the fixed base, provided it really works as one would think it could work.

I asked for this briefing because of interest in it. This is a chance for the committee and the Chair to get some information on what looks like a promising weapon.

It is true, is it not, that seven-tenths of the earth's surface is covered by water?

Admiral COMBS. That is right.

Senator SYMINGTON. And this plane can take off and land in 4- to 6-foot waves, is that right?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. And it can be refueled in the air, or on the sea by submarine or any other type ship?

Admiral COMBS. Yes; in the air by other tankers and from submarines.

Senator SYMINGTON. Or from any type ship.

Will you proceed, Admiral?

THE P6M

Admiral COMBS. The P6M has a combat ceiling in excess of 40,000 feet, and unrefueled combat radius more than 1,500 miles, and can carry a heavy weapons payload. (D)

More precise data will be furnished in classified form.

Senator SYMINGTON. We were talking yesterday about the P2V. I think that was the famous plane, Admiral, you called the Truculent Turtle.

Admiral RUSSELL. Yes, sir.

Senator SYMINGTON. That went 11,000 miles.

It was a specially rigged-up job?

Admiral RUSSELL. It was indeed, sir.

A B–52 SEAPLANE?

Senator SYMINGTON. But there is no reason why this plane, with minor exceptions, should be limited in the load-carrying capacity, the range, the speed, the altitude any more than a land-based plane is limited, is there?

Admiral COMBS. That is right, yes, sir.

It should not be limited.

Admiral RUSSELL. I would point out, sir, that a jet airplane burns tremendous quantities of fuel, and as you extend the range in a design such as this, the gross weight goes up very considerably.

Senator SYMINGTON. Yes, I understand that, but there is no reason why you could not have a seaplane B–52, is there?

Admiral RUSSELL. No, sir.

Senator SYMINGTON. That is what I am getting at.

Admiral RUSSELL. But as you extend the range, sir, you would increase the size of the basic vehicle.

This is the point I would like to have you understand.

Senator SYMINGTON. I understand that.

But there is no need why you have to increase the size a substantial amount more than the size of the comparable land plane is there?

Admiral RUSSELL. No, sir. There is one theory which says you will get a more efficient structure because of the distribution of load on landing across the hull rather than concentrating the load in the wheels of the aircraft, for example.

Senator SYMINGTON. Your maintenance problem might be some more.

If you have a hull problem you might have some additional weight; but all those things would seem relatively minor as against the possibility of landing anywhere in the water, before the mission or afterwards.

Admiral RUSSELL. Yes, sir; that is correct.

(Senator Jackson entered the room.)

Admiral RUSSELL. The drag of the hull is something to consider. As your power goes up, the problem of breaking away from the surface of the water gets less.

In the old days it used to be very difficult to get an airplane airborne off the water.

Senator SYMINGTON. I remember one time during the war in the Azores we had to make our own waves so we could get off at all.

Is that what you mean?

Admiral RUSSELL. Yes, sir; that is right, but as your power goes up this becomes less and less a problem, and there are some very efficient shapes which have been developed to take care of the hydrodynamic portion of the problem.

DEVELOPMENT TAKES TIME

Senator SYMINGTON. Admiral, although this is a deviation, are you satisfied with the amount of development that you are putting into this plane, or would you rather push it harder than you are pushing it now?

Admiral RUSSELL. Mr. Chairman, quite obviously, being an aviator I would like to push it all we can. I think though that this is a very reasonable program, and I doubt that at the present state of the art we can go much faster with it.

Of course there is a tremendous problem behind this of the tenders to match it and training people into it.

Even though we would like to accomplish things overnight, this cannot be done practically as you understand, sir.

Senator SYMINGTON. Off the record.

(Discussion off the record.)

Senator SYMINGTON. Back on the record.

Do you want to make any comment on that?

Admiral COMBS. No, sir, I have no comment, sir.

I think it is a good airplane and I believe a lot of folks should be interested in it.

We certainly are.

Senator SYMINGTON. It impresses me as a weapon very much, considering other weapons in all services.

Admiral COMBS. Yes, sir.

Senator SYMINGTON. Will you proceed.

THE P6M

Admiral COMBS. In performing a mining mission, an aircraft such as the P6M has a reduced range due to the heavy load and the low level flight. The latter gives it an advantage against radar detection.

As an illustration of what can be done with the high-performance attack-type seaplane, suppose we station a P6M task group as shown here. (D)

This is a sketch of the seaplane tender U. S. S. *Albemarle*, showing the stern ramp and servicing boom for handling the P6M. This tender is undergoing conversion now and will join the fleet in August of this year. An additional tender, the U. S. S. *Currituck*, went into the yard this month for the installation of a servicing boom.

This is a sketch showing the concept for refueling P6M's from a submarine. The U. S. S. *Guavina* has been converted for seaplane refueling and has conducted several exercises with the P5M seaplanes which you saw yesterday, over the past 18 months, simply to develop the concept.

FEATURES OF SEAPLANES

Senator SYMINGTON. In other words, you have a plane land on the water, and you refuel from that plane on the water?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. Or you would refuel from that plane in the air?

Admiral COMBS. From the plane in the air.

You could refuel from a submarine or we can refuel from the tender. When they are alongside that tender they can refuel, take on all their stores, change crews, do practically anything.

Senator JACKSON. Right at that point, doesn't that again add to the importance of the ANP program if applied to a seaplane?

You could hide in various places. You have no problem of logistics support at all.

Admiral COMBS. Yes, sir.

Senator JACKSON. You can hide out some place and not even worry about refueling; then move in. You could land on the water any place, and then move in.

Admiral COMBS. Yes, sir.

Senator JACKSON. All of this support that you are talking about, tenders, everything, is not even needed?

Admiral COMBS. The tender support would probably be needed, sir.

Senator JACKSON. With the ANP program?

Admiral COMBS. It would not be necessary then to go back so far to get your replenishment mines or replenishment bombs or things like that which you could not carry with you.

Senator JACKSON. You mean for a long-term operation?

Admiral COMBS. Yes, sir.

Senator JACKSON. But you could have your logistics support of whatever kind a long way from a land base?

Admiral COMBS. Yes, sir; that is right.

Senator JACKSON. They could go back—to protect your supporting forces they would not need to be so close in?

Admiral COMBS. That is right. They would need only to come back to their main base in the event of changing their reactor or some sort of an operation such as that.

The changing of crews, refueling and all that, I mean replenishing with bombs, rearming, could all be done in the forward area.

That would enhance it a great deal, sir.

ATOMIC SUBMARINE

Senator SYMINGTON. I noticed in a talk by one of the Secretaries that this *Nautilus* has gone over 36,000 miles now without refueling.

Admiral COMBS. Yes, sir.

Senator SYMINGTON. I believe it said some 20,000 miles were under the water.

That would be an ideal instrument to refuel this plane secretly somewhere; wouldn't it?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. Is it harder to detect an atomic submarine than it is a normal submarine because it does not have to come up?

Admiral COMBS. Yes, sir; it is; as long as it stays down it is harder to detect with the normal detection apparatus such as the normal ship uses with its radar, but it can be detected by sound recording mechanisms. (D)

MISSION OF SEAPLANE

Senator SYMINGTON. What you have done here is describe missions based on the performance of the P6M; is that right?

Commander HALLER. Yes, sir.

Senator SYMINGTON. The mission capability would be in direct proportion to a bigger, faster, longer-range airplane; would it not?

Commander HALLER. I would like to refer this to the admiral.

Admiral COMBS. That is right; yes, sir.

May I comment, sir, that those missions are performed by the task force; that is it must include the tenders and the submarine along with the aircraft.

Senator SYMINGTON. It does not necessarily have to include those. It could take off from a place without a tender, and without a submarine; it could still do its mission; could it not?

Admiral COMBS. It could do its mission with a shorter range; yes.

FUTURE SEAPLANE LIKE B–52

Senator SYMINGTON. What we are trying to do in these hearings is find out about airpower, the future of airpower.

Maybe 25 years from now most of the airpower except for airlift will probably be in the missile field, but that is not our problem today. What I am trying to get at is there is no reason why you can't have a sea B–52 any more than you can have a land B–52, is there?

Admiral COMBS. No reason at all, sir.

Senator SYMINGTON. If you have a plane with the range and the altitude and the carrying capacity of a B–52, but a seaplane, you wouldn't have to worry as much as you do now about where your tenders are; and you would still have the advantage of being able to strike out at the land from the water, is that right?

Admiral COMBS. Yes.

Senator SYMINGTON. If that is true why do you fool around with a medium bomber, or actually in this case based on some of the limitations, with the operating radius of a light bomber? Why don't you go ahead and build a heavy bomber as a seaplane?

Admiral COMBS. We are going ahead with that, sir, but we feel that there are a lot of things we have got to learn, and we can learn those things as we go along.

We are learning a tremendous amount with this airplane. Instead of taking the thing in one big jump, we would rather take it in several smaller jumps and be sure of our way as we proceed, as we progress.

Senator SYMINGTON. There is no arbitrary limitation to a seaplane, any more than there is an arbitrary limitation to a land plane; is that right?

Admiral COMBS. That is right, sir, but we must always remember that we have got to provide for its maintenance and support.

Senator SYMINGTON. You have to do that for a land plane, too.

Admiral COMBS. That is right; and you get that from your airfields.

We, at the present time, are getting the same thing from our tenders and from our submarines.

Senator SYMINGTON. What are the limitations of making a plane like this an amphibian plane? Does that much reduce your performance?

Admiral COMBS. It would a great deal, yes, sir, because then you would have to carry along with you the same weight for your landing gear that the B–52 carries.

That is one of the reasons, in this airplane, that they gain considerably.

They do not always have to carry around the tremendous weight of those big landing gears which the land plane carries, and only use at the time that it is on the field.

Senator SYMINGTON. If you had a landing gear you could operate in the Far North; couldn't you?

But a seaplane might be different?

Admiral COMBS. It would be difficult to land a seaplane safely on ice without some kind of landing gear.

Senator SYMINGTON. This is an interesting possibility as a weapon, don't you think so, Senator?

Senator DUFF. I am very much impressed.

Senator SYMINGTON. Have you any questions you would like to ask before the Admiral goes ahead?

Senator Jackson?

USE OF AIR ATOMIC POWER

Senator JACKSON. I would like some time, if the Navy develops it, to ask questions about air atomic power.

The very essence of air atomic power presupposes the capability to stop the enemy in the shortest time possible.

In other words, we are talking about deployment of air atomic forces around the world; but if the balloon goes up and it takes us 2 or 3 days to get the forces ready for that attack, we may have caused a situation where we have lost several American cities.

Now I would like to get the briefing as to disposition of our forces in the future.

If the balloon goes up, how long will it take the air atomic wing of the Navy to hit their targets.

I think that goes to the heart of this problem, because the very premises of air atomic power presuppose an ability to inflict atomic destruction instantaneously. Time is of the essence, and without that factor, of course we are not maximizing the atomic weapons that are available.

ADMIRAL COMBS. We can cover that later.

Senator JACKSON. I would like to have you go into that thoroughly sometime, because I think that is very important.

Senator DUFF. If I may say so, I am very much interested in that briefing, too.

Senator JACKSON. Yes, I want to be fair about it, and when we get into the interrogation section, I want you to know what is on my mind.

Mabe it is not a fair question, but it seems to me it goes to the heart of the problem.

Senator SYMINGTON. Following your thought, Senator.

Admiral, war is still firepower, and the capacity to deliver that firepower, is it not?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. And the faster you can deliver that firepower, the better; is that not correct?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. Will you proceed.

ADVANTAGES OF SEAPLANE

Admiral COMBS. You have seen here a concept for the deployment of the P6M. Protected water areas, suitable for attack type seaplane operations, are available in most areas of primary interest to the United States Navy. The Navy alone has the background and experience for support of seaplanes in these areas. The geographical area which I have used as an illustration is only one of many such areas from which a seaplane striking force could operate and provide the following advantages:

(1) A conventional or nuclear delivery capability in a ready status in the area.

(2) A force which, due to its mobility, would be most difficult for an enemy to locate and destroy.

(3) A force whose flexibility of operations permits the application of a versatile mining capability, and at the same time contains the capacity for enlarging the scope of nuclear attack on targets of naval interest.

(4) A force which would augment our carrier striking forces by adding additional pressure on the peripheral areas of the U. S. S. R., and

(5) All of the above advantages with no permanent installations to be constructed, defended, or abandoned on foreign territory.

P6M PROTOTYPE AND PRODUCTION PROGRAM

P6M Procurement: Now to the numbers of aircraft, and the general plans for fleet delivery:

The original contract with the Glenn L. Martin Co. called for two XP6M aircraft, the first of which made its initial flight in July 1955. This aircraft was "flight-test instrumented" only—in other words, it did not have the electronics equipment which will be necessary for carrying out the mining mission.

As the No. 1 XP6M continued with the various phases of flight evaluation, flight-test data showed equal or superior performance as regards the design criteria for such an aircraft. Additional production prototype aircraft were funded for in the fiscal year 1956 funds in order to have a sufficient quantity of aircraft for evaluation in 1957. (D)

A number of production P6M's were placed on the fiscal year 1957 procurement list, but it will be a few years before we have them in operational quantities. (D)

In December 1955, the No. 1 XP6M crashed while on an evaluation and demonstration flight. This resulted in a delay of about 4 months in first flight of the No. 2 XP6M, which flew for the first time on May 18. (D)

Fleet delivery is expected to commence in early fall 1958. (D)

Procurement of P6M's beyond the fiscal year 1958 program will be based on the requirements generated by the successful integration of the P6M into the fleet.

Senator SYMINGTON. Thank you, Admiral.

Does that complete this briefing?

Admiral COMBS. That completes this one. I have another short one which has to do with the Navy and Marine airlift which was requested after my basic presentation was prepared.

Senator SYMINGTON. We would like to question you on this seaplane presentation before we lose the feel of the briefing.

Admiral COMBS. Yes, sir.

Senator SYMINGTON. Mr. Counsel, have you any questions?

Mr. HAMILTON. Yes, sir, I have a few.

AREA AND CONDITIONS AS LIMITATIONS ON P6M OPERATIONS

Admiral, you mentioned that the P6M could land, or I believe the chairman did and you agreed, in waves of as high as 6 feet; is that about right?

Admiral COMBS. That is about right; yes, sir.

Mr. HAMILTON. Would that, Admiral, give you substantially an all-weather capability, or do you run into waves much higher than that?

Admiral COMBS. Out in the middle of the oceans or the seas, you do run into waves higher than that in storms.

Now this plane, we will not land in the middle of the ocean. We will find protected places, and there are many all over the world; where we can be sure that the waves are not so high as to damage the hulls, and there is where we will operate from.

Mr. HAMILTON. You think that you would be able to find areas more or less irrespective of the weather, that would enable you to keep this plane operational?

Admiral COMBS. Yes, sir.

Mr. HAMILTON. Would that be true of such areas, for example, as up in the North Sea or up in the North Pacific?

Admiral COMBS. Yes, sir.

Mr. HAMILTON. You think you could find places up there where you could operate, despite the weather?

Admiral COMBS. Yes, sir.

Mr. HAMILTON. Is there much of a difficulty, from a navigation standpoint, in setting up the rendezvous between a plane of that kind and a tender, whether surface or submarine?

Admiral COMBS. No, sir.

Mr. HAMILTON. You don't have navigation problems that would not be soluble?

Admiral COMBS. Simply the transmission of messages from one to the other, from the tenders or from the airplane, even to the submarine.

Mr. HAMILTON. Do you suppose it would be more difficult than refueling from the air?

Admiral COMBS. No, sir.

COST OF PGM'S IN LIMITED QUANTITY

Mr. HAMILTON. I wonder if you could tell us what an aircraft like this will cost when we get into production.

Admiral COMBS. Admiral Russell will answer that.

Admiral RUSSELL. Based on the production schedule programed, we estimate a unit cost of $5,585,000. (D)

Mr. HAMILTON. $5 million.

Admiral RUSSELL. In addition to that, in order to support it, the spares which are necessary to keep this aircraft in service is another $2,353,000. This makes a programed cost of the aircraft and its support of $7,938,000.

Mr. HAMILTON. What were the costs of the two prototypes that you developed, if you have those?

Admiral RUSSELL. I regret I do not have any experimental costs here. (D)

As you understand, you go down the learner curve, the unit cost drops off, and you can see here, the price will continue on down. (D)

Mr. HAMILTON. Yes, I think your figures show that.

Senator SYMINGTON. Have you any extrapolation of a projected cost for say a couple of hundred of these. What the unit costs would be?

Admiral RUSSELL. We have not gone that high, sir. We are working now on our fiscal year 1958 estimates, and it comes down, the learner curve, as in normal aircraft, sir.

Senator SYMINGTON. You said $8 million. (D)

Admiral RUSSELL. Yes, sir.

Senator SYMINGTON. That is as far as you have gone; is that right?

Admiral RUSSELL. That is as far as we have gone; yes, sir.

Senator SYMINGTON. 8 million is counting spares, too?

Admiral RUSSELL. That is counting spares; yes, sir.

This is the program cost of the unit aircraft plus its operating spares.

SEAPLANE TASK GROUP

Mr. HAMILTON. Admiral, you mentioned that a P6M task group would consist of seaplane tenders, submarine refuelers, and P6M's. (D)

Admiral COMBS. That is right. (D)

Mr. HAMILTON. The seaplane tenders and the submarine refuelers likewise have to be built; or can they be obtained by converting existing vessels, ships? (D)

Admiral COMBS. They can be obtained by converting existing ships, we believe.

Mr. HAMILTON. What do you plan in that regard?

Admiral COMBS. Well, as I said, we have the *Albemarle*, which is a converted tender; and the *Guavina*, which is a converted submarine.

The converted submarine has proved very successful in the test we have run to date with other aircraft.

We think that the *Albemarle*, the tender, will also prove successful with the ramp and the boom as we indicated here. However, we want to try that out and see. We have got it just about finished. It will join the fleet before too long; and the *Currituck* is going in to get similar modification.

With those two tenders, we will run a series of tests with the planes; and we feel at the present time, unless we run into difficulties, that we can handle this by conversions. We may find that we have to have tenders designed right from the keel up for the advanced type of jet seaplane.

Those are the things that we are taking step by step to determine.

Mr. HAMILTON. So that you really have to progress to the point where you know whether you can really get your seaplane tenders and submarine refuelers by conversion, or whether you have to get new ones?

Admiral COMBS. We feel pretty confident, but we do not think we could make up our minds right today that we would or would not be able to do it.

DIFFICULTIES OF SEAPLANE SUPPORT

Mr. HAMILTON. If you were able to equip aircraft of this kind with nuclear engines, would that in any way diminish your requirement for submarine tenders and refuelers?

ADMIRAL COMBS. It would strike out our need for submarine refuelers. It would not, it seems to me, mean that we could give up tenders completely, because we feel that the maintenance and the logistics problems of an airplane at sea are a very important part of this business. The maintenance and logistics of a plane on the land are a big problem. It is also a big job on the sea.

I think it is more complicated with the plane basing on the water, because of many inconveniences that you have. Your crews have to get back and forth by boat instead of going and jumping in a truck and doing it. You have to transport a lot of your equipment by boat and get it under the boom and put it aboard under the boom.

And there are many things which are different between the support and maintenance of a landplane and a seaplane. I think we will need tenders for some time.

Senator JACKSON. Admiral, right at that point, if you do not mind, to keep the record straight——

Admiral COMBS. Yes, sir?

POSSIBILITY OF ATOMIC POWER

Senator JACKSON. Getting to the ANP program again, why would it not be reasonable to assume that you might build a submarine, whether it is atomic or conventional, and use it as a tender?

You could have it up fairly close, or put it wherever you want, and it could be submerged. It would not be detected. Would it not be better to be able to eliminate the refuelers and have only one support vessel? Would you not be, from a strategic standpoint, better off to have one that could be submerged and not susceptible to enemy intervention?

Admiral COMBS. It would, indeed, sir. I am thinking now particularly——

Senator JACKSON. I would think your tender in such an event might be a submarine of some kind. (D)

Admiral COMBS. The submarine, I believe, sir, would not answer the purpose for this reason, and I am turning that over in my mind: The fact that a nuclear seaplane, living away from its base for long periods of time, would need many, many replenishments of mines or bombs that it carries.

Senator SYMINGTON. Why would it have to be away from its base for long periods of time, if it had the range?

Admiral COMBS. Well, you just save the time it takes for the plane to go from where you would normally use it, back to the United States or back someplace to replenish.

Senator SYMINGTON. That is a limitation that any airplane with range has. The shorter the range, the more dependent it has to be on foreign bases, or tenders.

If you have the range in the plane, why, you do not have to worry about your tenders, of course.

Admiral COMBS. It can well come back to the United States or to rear areas. But if it is up nearer to the target, we get back to this "getting the hits on the target in a hurry," or repeatedly; you get them there quicker, you see.

Senator JACKSON. Admiral, you could build a big atomic subtender or tender-sub, whatever the proper descriptive title is. There is no limitation on that. You can build them pretty big. Rickover has big ideas on this. Having been with him since this thing started, when everybody laughed at him, I have great respect for his imagination and his ability to capitalize on it.

I am just wondering if that is not a possibility—just as a layman, now. I do not know anything about it. It raises a question.

Admiral COMBS. It is a definite possibility; yes, sir.

Senator JACKSON. With an atomic sub, you do not have the fuel load to carry around, and you will get even more space as we improve the art and make it better.

Why do we have to think always in conventional terms of a tender on top of the surface? You could take an atomic sub, put it under the water, and maneuver in a lot of areas where the enemy would not be able to get at you; and you could come up close if you wanted to.

As I recall some of the recent tests with the *Nautilus*, in maneuvers it has been pretty rough, as far as the enemy is concerned; it ran circles around some things, from what I have been reading.

Admiral COMBS. Well, all those things, Senator Jackson, are being considered as we go along and learn more about these things.

SEAPLANE TENDERS

Senator JACKSON. I am glad you say that. When we talk about a tender, it does not have to be a surface tender; does it?

Admiral COMBS. A tender does not have to be a surface tender if it can carry and do the things that we require it to do.

Senator JACKSON. That is what I mean.

Admiral COMBS. That is right.

Senator JACKSON. And a submarine does better, as far as speed is concerned, under the water, than it does on top of the water; is that not right?

Admiral COMBS. That is right.

Senator JACKSON. That is all. I just wanted to complete the record.

Senator SYMINGTON. To follow up on that point, you do not have to have any kind of a tender—under the water, or over the water—if you have the range to come back to where you started from; is that not right?

Admiral COMBS. You can do that; yes, sir.

NECESSITY FOR REFUELING

Senator SYMINGTON. We all know the B–47 has a weakness as an intercontinental bomber; that is, it has not got the range, so it has to take off from a foreign base, or it has to be refueled, or it might as well be out of the picture from the standpoint of effectiveness in a strategic attack.

If you have a seaplane which has a range comparable to the B–52 instead of the B–47, you do not have to depend on tenders any more than you would have to depend on foreign bases. You would go somewhere, drop your load and come back. Is that not a fair analysis?

Admiral COMBS. That is right; yes, sir. And the only point that I wanted to make there was that you spend time coming back, and you could obviate that by taking your refill of bombs, or whatever you need, closer to the target.

Senator SYMINGTON. If you have, say, the same speed as a B–52, you would not spend any more time than the B–52 does; would you?

Admiral COMBS. It shouldn't; no, sir.

LAND PLANES VERSUS SEAPLANES

Senator JACKSON. I think the important thing is that if you have your tender fairly close in to your target area—I am getting to my submarine point again—assuming an ANP operation aircraft, you would be able to make more sorties, if you are just coming back for weapons and supplies and to change crews.

You do increase the air-atomic capability of that craft by being able to engage in more sorties, do you not?

Admiral COMBS. Yes, sir.

Senator JACKSON. Within a period of time.

Senator SYMINGTON. That would be true in any case.

Senator JACKSON. Yes, but a land-based plane would not have that capability. It would have to go back to a land-based facility to pick up its supplies and go back; even if it was an ANP land-based craft, it would still have to go back to some land mass where it could land.

Senator SYMINGTON. And the seaplane has to go back to some sea mass.

Senator JACKSON. But the sea mass would be closer to the Soviet land mass.

Senator SYMINGTON. It might be detectable if it were closer.

Some of us believe that, with respect to some of these fixed bases we are building very close to the Soviet, it is probably giving them a base instead of giving us a base.

Senator JACKSON. But the base to which the land plane is going back might not be there.

Senator SYMINGTON. What was that?

Senator JACKSON. The base to which the land plane is going back might not be there.

Senator SYMINGTON. The seaplane tender to which the seaplane was going back might not be back there either.

Senator JACKSON. That is right.

SEAPLANE ALSO HAS HAZARDS

Senator SYMINGTON. What we are talking about is range, not the relative merits of land or water, or underwater. Senator Jackson is very keen on the atomic situation. I emphasize that I am, too; but if it is correct that you can detect a submarine under water by sonic devices, just as well as you can on top of the water, and if it is known that those submarines might be in the process of refueling seaplanes which have hydrogen bombs or atomic bombs on them, then, as I see it, you are going to have as much trouble keeping the enemy from destroying an underwater tender as you are going to have with a surface tender, or a fixed base.

What I would like to see in a seaplane would be more speed and more range. After you get that, I do not see how you can get a much better weapon in a piloted setup, and the missile picture, vital in development, is still some time off.

Admiral Russell, how do you feel on that, with your long experience in this field?

Admiral RUSSELL. Yes, sir; I have had considerable experience in seaplanes, sir.

I started in the war in the Aleutians, which was a very tough place to operate, as commanding officer of a seaplane squadron, and we did a lot of things which proved the flexibility of their weapons system.

For example, we could disperse. I had only one plane at Dutch Harbor when it was attacked by the Japanese. We dispersed all over the countryside, bays, coves, and every place else. A very desirable spot was a fresh-water lake.

Some of the lakes, however, are extremely shallow, and we developed a very simple trick to sit down on a lake. We took one fathom of twine and put a rock on one end, a wooden clip on the other. We

flew over the lake, throwing out every three seconds a rock and a piece of wood. We came back over the line. If all the chips were submerged, the water was over 6 feet, so we sat down.

And it was delightful to wait out your next patrol on a fresh-water lake, because you knew there was no Japanese submarine which could get out on the lake.

We had our tender, U. S. S. *Casco*, torpedoed sitting in a roadstead where she was servicing us; but on a lake, this is just an example of the flexibility.

Senator SYMINGTON. Very interesting.

IMPORTANCE OF PROXIMITY TO TARGET

Admiral RUSSELL. May I add one thing, sir. I believe in talking about the necessity of tenders, that you may still need them, even though you have extremely long range, for flexibility of operations.

The shortness of the distance to target means more missions over the target, if your weapons are closer which you have to pick up.

Further than that, your fixed base at home may be vulnerable. You might still want to have an alternate source of servicing for the seaplanes.

Senator SYMINGTON. What we really mean is this, do we not? Whether it is seaplane, or carrier, or land-based plane, regardless of what it is, the closer we can get to the target without being destroyed, the better performance over the target; is that not a fair statement?

Admiral RUSSELL. Yes, sir.

Senator SYMINGTON. The *Mars* was a seaplane, was it not?

Admiral RUSSELL. Yes, sir; it was a seaplane.

Senator SYMINGTON. What was its range?

Admiral RUSSELL. The *Mars* is a wonderful load carrier from the coast to Honolulu, which is about 2,000 nautical miles. If you take off cargo and put on fuel, it will go a great distance.

I do not know, offhand. You can probably go TransPac if you filled it up with fuel and no payload. But about 2,000 nautical miles is about right as far as that aircraft is concerned, carrying cargo.

RADIATION RISK GREATER ON ATOMIC PLANE

Senator SYMINGTON. Once you get an atomic-powered plane, you can go a long way with a seaplane, or a land plane or any kind of a plane; is that not right?

Admiral RUSSELL. Presumably it would be limited only by the radiation exposure of the crew, in the ultimate sense.

Senator SYMINGTON. Is that a much more serious problem on an airplane than it is on this submarine that has gone some 136,000 miles without refueling?

Admiral RUSSELL. Extremely so; yes, sir. Carrying the shield of the reactor into the air is terrific. The powerplant, in pounds per horsepower, in the *Nautilus* is around 145 pounds. To make it practical in an airplane, you have to come down to about three-quarters of a pound per horsepower. That is the order of magnitude of the problem.

Senator SYMINGTON. The more you get into the question of shielding, the more you get into weight, too, do you not?

Admiral RUSSELL. That is correct, sir.

Senator Duff or Senator Jackson or Mr. Counsel, any time you want to interrupt on this one, just enter the discussion.

Senator DUFF. Whenever the admiral finishes, I will ask some questions.

Mr. HAMILTON. I don't have anything further at this time.

Senator SYMINGTON. Senator Jackson?

Senator JACKSON. Do I understand that this completes the briefing on the naval air?

Admiral COMBS. No, sir. I have one more, which was requested by the committee.

Senator JACKSON. This is on the seaplane.

Admiral COMBS. It completes the briefing on the seaplane, yes, sir.

LIMITATIONS AND RISKS OF PLANES AT SEA

Senator JACKSON. All right, fine. Then I have a couple of questions.

What is the limitation of wave height?

Admiral COMBS. It is about 6 feet. (D)

Senator JACKSON. This would indicate some limitations on where it can be used; isn't that correct? (D)

Admiral COMBS. Well, it isn't designed for heavy weather in the open ocean. In certain situations, a land-protected area is required. (D)

Senator SYMINGTON. Would you yield for just one question?

For information only and not in any contentious spirit, do you believe that, with the many thousands of jet fighters the Communists have in the Mediterranean area, you could have carriers and planes in that sea to deliver an air attack? (D)

Admiral COMBS. I do, yes, sir.

Senator SYMINGTON. That is my question. Go ahead, Senator Jackson.

Senator JACKSON. It seems to me, Admiral, that if the Seamaster is to play a strategic air role in the case of a surprise attack, you must have forward facilities in being at all times. (D)

Admiral COMBS. Yes. That is correct. We would, of course, plan to have some of these craft already deployed from the United States area. (D)

PRESENT OPERATIONAL SEAPLANES WITHOUT STRATEGIC CAPABILITY

Senator JACKSON. The seaplanes that you have at the present time have rather limited striking ability; I mean they are prop driven—what are they, PBM's?

Admiral COMBS. PBM's, P5M's.

Admiral GRIFFIN. P5M's.

Senator JACKSON. What is their speed?

Admiral COMBS. They are very slow. They have no strike capability. They are patrol, antisubmarine aircraft.

Senator JACKSON. With not any real air-atomic capability?

Admiral COMBS. No, except for ASW.

Senator JACKSON. They are to be used to interdict shipping and their submarines?

Admiral RUSSELL. May I answer this: The P5M–2 is an antisubmarine airplane. It is built for that, sir, and it is not good for the purpose you referred to, strategic bombing.

Senator JACKSON. That was what I wanted to understand.

Admiral RUSSELL. No, sir. It is a specialized airplane; it is particularly adapted to and only suitable for that purpose.

Senator JACKSON. As I understood, the admiral was using that merely as an illustration of what you would do once you got the jet seaplanes.

Admiral GRIFFIN. That is correct; yes, sir.

Senator JACKSON. I mean in operational status.

Admiral GRIFFIN. Yes, sir.

Senator JACKSON. I have some other general questions that I would like to hold for a while.

Senator SYMINGTON. Senator DUFF?

Senator DUFF. How long do we have, sir?

Senator SYMINGTON. We are going to finish these questions on the seaplane, and we will have a final briefing, and then stop at 12:30, and start with the Army at 2 o'clock.

Senator DUFF. I have some notes here that I would like to ask some questions about.

ADVANTAGE OF CLOSENESS TO TARGET

First off, for a continuation of the question that Senator Jackson has asked: If you always kept deployed part of your forces in the forward areas with these weapons, would you not be able to deliver a counterstroke as quickly as a strategic air force would from the United States? (D)

Senator SYMINGTON. Would you repeat that again, Senator?

Senator DUFF. Read the question.

(The question was read by the reporter.)

Admiral COMBS. I believe we would, sir; probably quicker.

Senator DUFF. That is what I wanted to develop.

In view of the distance from the target, your capability of delivery in the event we were to be hit by a surprise atomic attack in the United States, you would be over the targets quicker than the strategic aircraft from the United States could hit those targets; is that correct?

Admiral COMBS. Yes, sir, because the distance from us to the targer would be less.

Senator DUFF. I have several other questions here.

NUCLEAR WEAPONS DECREASE VULNERABILITY OF CARRIERS

We have had testimony before the committee that nuclear weapons have increased the vulnerability of all types of targets, particularly fixed targets which can be pinpointed in advance for attack.

My question is: In your judgment, have nuclear weapons increased or decreased the vulnerability of aircraft carriers in relation to stationary targets?

Admiral COMBS. I believe, sir, that they have decreased the vulnerability.

I think that was my answer, that the vulnerability of a carrier task force is decreased against or as compared to a fixed land target,

against the ballistic missile. That was my understanding of the question. The carrier task force is highly mobile; the land target is fixed.

Senator DUFF. That is right.

Admiral COMBS. Yes, sir.

NAVY FORCES IN ADVANCE AREAS COULD ATTACK PROMPTLY

Senator DUFF. The third question I have written down here you have substantially answered in response to a question of Senator Jackson's.

And that statement, as I have it, was that the opinion has been expressed that we cannot count on the Navy for atomic retaliation in the event of an atomic surprise attack against the United States, by reason of the fact that you would not know where the Navy would be at the time of the surprise attack.

But you have already answered that by saying, as I understand it, that by your deployment of part of your forces, always, in forward areas, you always would have them in an area where you would immediately attack. Is that correct, sir?

Admiral COMBS. The force we have deployed in those areas are capable of immediate attack.

MOVING TARGET

Senator DUFF. Then another note I have here is: Would you care to comment on what you believe is the most effective capability of delivering atomic weapons against an overseas enemy, particularly in reference to a comparison between fixed overseas bases and movable bases provided by your aircraft carriers?

Admiral COMBS. May I have that repeated?

Senator SYMINGTON. Will you read the question again?

(The question was read by the reporter.)

Admiral COMBS. Well, in the case of the overseas base being attacked by an enemy, that enemy always knows where that base is. Its latitude and longitude are well known to all concerned.

That base could be hit fairly accurately by ballistic missiles when they are perfected, and by aircraft, keeping in mind that everyone knows where that base is.

That is not true with a carrier task force. It is moving, it changes its position at the rate of some 25 to 30 miles an hour.

A moving target is very, very hard, if not impossible, to hit accurately by a ballistic, long-range missile.

As we know, the location of the target for that missile must be cranked into that missile before it starts its travel across to the target.

Senator SYMINGTON. Excuse me, Admiral. You are talking about surface-to-surface only, or air-to-surface as well?

Admiral COMBS. I am talking about surface-to-surface ballistic missiles, Mr. Chairman.

Senator SYMINGTON. You might carry on as to the air-to-surface missile in answering—the entire missile picture.

Admiral COMBS. Yes, sir.

The air-to-surface missile presupposes that the attacker is close enough to the carrier task force so that that missile can hit with accuracy.

The missile must be carried to its launching point in an aircraft. We have in the carrier defense, carrier air defense planes in the air, and as we have said in our briefing of yesterday, we will have soon the surface-to-air missiles. We will have airborne early warning aircraft over our fleet so that we know when those planes are coming in.

The incoming plane will be using his radar, if he hopes to find the fleet. We use that radar of his to find him, along with our own radar searching, and we have radar countermeasures where we can "home" our planes on him.

Our plan is to get that aircraft which is carrying the air-to-surface missile far enough out so that missile does not endanger the ships of our fleet.

I think that is my answer to that, sir.

Senator DUFF. There are two other questions that I would like to ask, if I may.

NAVY MIGHT SURVIVE INITIAL ATTACK

Field Marshal Montgomery recently made the comment that, in his judgment, after the first blows of the surprise attack had fallen, the navies alone might remain undamaged and be able to carry on the battle.

Would you care to comment on that, as coming from a land-based operation?

Admiral COMBS. Would you mind repeating that?

(The question was read by the reporter.)

Admiral COMBS. I think—I agree with it, sir. I think that there is a good possibility that that might happen.

Senator DUFF. Mr. Chairman, this next question is interfering with the ground that we do not want to get into.

I would like to ask it, and then you can make your comment.

Would you care to comment on the opinion sometimes expressed that the Navy should stop building these super aircraft carriers and spend their time on antisubmarine forces in their place?

(The question was read by the reporter.)

SHOULD WE CONTINUE TO BUILD ATTACK CARRIERS?

Admiral COMBS. Well, I have not heard of anybody who understands modern naval warfare who advocates stopping the building of aircraft carriers.

Now, I think way back in the past——

Senator SYMINGTON. Excuse me, Admiral. Just to make the question clear, because it is an important question, in all this discussion of airpower, Senator Duff said super aircraft carriers. Do you differentiate in any way between an aircraft carrier and a supercarrier?

Admiral COMBS. No, sir.

Senator DUFF. What I am referring to, sir, is a supercarrier something like the *Forrestal* class.

Senator SYMINGTON. I thought that ought to be on the record.

Admiral COMBS. No, sir. I refer to the *Forrestal* as just one of our most modern carriers. I do not believe——

Senator DUFF. Assume in that question that I meant aircraft carrier of the *Forrestal* type.

Admiral COMBS. That is right, with the heavy attack aircraft that it can carry.

Senator DUFF. Yes, sir.

Admiral COMBS. No, sir; the aircraft carrier is the spearhead of the Navy's offensive.

I do not know who said this a long time ago, but somebody has said that the best defense is a strong offense. What would happen if we shifted our plan, as suggested here, and only built and concentrated on defensive antisubmarine forces, we would inevitably go from an offensive directly to a defensive force. This we cannot tolerate.

That, I think, no red-blooded American would ever want anybody to do. We have got to get out and hit the enemy where it hurts, and that is the way the Navy proposes to do it, with its aircraft carriers, and with the rest of the forces which support them, support our offensive, and in that way we carry the war to the enemy and provide our bit to the overall military force of this country.

ANTISUBMARINE MISSION IS NAVY NO. 1 PRIORITY

Admiral DAVIS. Mr. Chairman, may I add to that a little?

I would not like to leave any impression that the antisubmarine effort is minimized in the Navy. It is our No. 1 priority project.

Senator DUFF. I was interested in the answer which was given, that one was a defensive and the other was an offensive operation, primarily. Is that correct?

Admiral COMBS. That is correct; yes, sir.

Another point I would like to make about this antisubmarine warfare, we do have antisubmarine warfare forces, as we mentioned yesterday, but in addition to those nine carriers that we talked about, the CVA's have also an antisubmarine capability. Their aircraft on board them are capable not only of searching the waters around those carriers and helping out in the local antisubmarine defense, but also of striking the submarine bases.

CARRIERS HAVE SMALL STRATEGIC STRIKING POWER

Senator SYMINGTON. As I understand it, you are primarily interested in targets of naval interest, such as submarine pens; is that not right? (D)

Admiral COMBS. That is correct; yes, sir. (D)

Senator SYMINGTON. Based on your opinion of the capability of the carrier task force, you do believe you could deliver heavy weapons on deep inland targets from a carrier task force if such instructions were given you by the Joint Chiefs of Staff; is that correct? (D)

Admiral COMBS. Yes, that is correct. If we were to hit naval targets only, we would stay well out for defensive reasons while the other targets were being struck by the Strategic Air Command. (D)

If we move in close, we would have the ability to hit some of the SAC targets, except on a very much smaller scale, because we do not have nearly as many planes involved, as compared to SAC capabilities. (D)

PROBLEM OF SOVIET'S HUNDREDS OF SUBMARINES

Senator SYMINGTON. On the question of your detection of the air-to-surface missile from the airplane, in answer to Senator Duff's question, you also have the problem, with respect to your task force, of this very large submarine fleet the Russians now have; have you not?

Admiral COMBS. Yes, sir.

Senator SYMINGTON. And would that not be a danger which would have to be faced and met, again with respect to your task force?

Admiral COMBS. Yes, sir. Well, it would be met, not primarily and alone by the task force. It would be met by our hunter-killer submarines, by all of our power we have to combat and kill the submarines.

Senator SYMINGTON. You say hunter-killer submarine. You are going out to meet over 400 submarines, actually a lot more than 400. How many hunter-killer submarines have we?

Captain MCCAIN. I have not been sworn in, Senator.

Senator SYMINGTON. Captain, you tell the admiral, and the admiral will tell me.

Admiral COMBS. I am informed, sir, that we have both antisubmarine and antisurface vessel capabilities. (D)

UNITED STATES BUILT FIVE SUBMARINES LAST YEAR

Senator SYMINGTON. How many submarines did we built last year, 1955, the calendar year?

Captain, will you raise your hand and be sworn. Do you solemnly swear that the testimony you will give the subcommittee of the Senate Armed Services Committee will be the truth, the whole truth, and nothing but the truth, so help you God?

Captain MCCAIN. Yes, sir.

Senator SYMINGTON. Will you come up here where the reporter can hear you better?

Will you identify yourself, sir?

Captain MCCAIN. I am Capt. John S. McCain, head of the Progress Analysis Group in the Office of the Chief of Naval Operations.

Senator SYMINGTON. That is a mighty fine name you have there.

Captain MCCAIN. My father was Admiral McCain; he had Task Force 38 during World War II.

Senator SYMINGTON. I guessed as much.

Captain MCCAIN. I am sorry, sir, I do not know specifically. I estimate about five submarines.

Senator SYMINGTON. How many do you plan this year?

Captain MCCAIN. In the 1956 program, there are seven.

Senator SYMINGTON. In the 1956 program?

Captain MCCAIN. Yes, sir; that is the one that is going through, that is the one that is under consideration right now in the Senate—that is 1957, I beg your pardon, the 1957 program.

Senator SYMINGTON. How about 1958? What do you program for that?

Captain MCCAIN. That program has not been yet firmed up, sir, 1958. (D)

Senator SYMINGTON. How many submarines have you in commission at this time?

SOVIETS HAVE ABOUT FOUR TIMES AS MANY SUBMARINES

Captain McCain. We have got 110 submarines in active commission, sir.

Senator Symington. The last figure I had as to the number the Russians had was 430 plus. Have you any figure on that? This was a couple of months ago. Has that figure been changed?

Captain McCain. I cannot answer that question.

Senator Symington. Will you furnish that figure for the record?

Captain McCain. Yes, sir.

Senator Symington. And how many submarines did the Russians build last year?

Captain McCain. To the best of my knowledge, I cannot answer that question, either.

Commander Elkins. They are increasing rapidly, particularly their long-range submarines. I can give you our best estimates in classified form. (D)

HITLER'S SUBMARINE FORCE SMALL COMPARED WITH SOVIETS'

Senator Symington. As I remember, Hitler had 57 or 58 submarines when he started; is that correct?

Admiral Combs. Yes, sir.

Senator Symington. I know all about the different problems they have as against us, and so forth. But how long can we go on with a discrepancy like that, without getting into serious trouble, in your opinion, while we are building 5 to 7 a year and they are rapidly increasing their vastly greater force? What would be your comment on that? (D)

SOVIETS FAR OUTPRODUCING UNITED STATES IN SUBMARINES

Admiral Combs. My comment would be this, sir: I do not believe we are attempting to match them, submarine for submarine.

Senator Symington. I do not think so, either. That is pretty obvious.

Admiral Combs. Yes, it is pretty obvious.

Senator Symington. I did not mean that sarcastically, either.

Admiral Combs. Their submarine-building plan is tailored to what they propose to do in war. With ours, of course, we do likewise. They know we have many ships, they know we have got to keep the sealanes open from our own country to our allies.

Senator Symington. They know how many carriers we have to defend us.

SOVIET SUBMARINES THREAT TO UNITED STATES SUBMARINES AND CARRIERS

Admiral Combs. They know we have a lot of ships on the ocean.

Senator Symington. Including carrier task forces.

Admiral Combs. Carrier task forces, and that is what they are building for.

We are building our submarines more for the many kinds of use we have for them. (D)

Senator SYMINGTON. With the great numerical advantages the Soviets have in submarines, wouldn't it be reasonable to believe that they would employ some of them to destroy your submarines? (D)

Captain MCCAIN. That is right. And submarines are a particularly deadly menace to other submarines, as you can imagine. (D)

CAN UNITED STATES MATCH SOVIETS IN ANY ASPECT OF MILITARY POWER?

Senator SYMINGTON. Captain, here is what worries me. I want to see us with the finest military establishment in the world, which means the finest Navy, the finest Air Force; and, at least in quality, the finest Army. I have never seen any sense in being the richest man in the graveyard.

We are getting a philosophy in this country which might be described this way: In 1948, we said we could not afford to match them man for man. In 1952 we made a decision that we could not afford to match them submarine for submarine.

This year, we hear in high quarters we cannot afford to match them plane for plane. It is generally acknowledged now, by those who are experts in the field, that we have reached a position where we cannot afford to match them scientist for scientist, or engineer for engineer.

Four years ago we graduated 50,000 engineers and scientists, they 20,000. Last year the figures I have show we graduated some 19,000, they 54,000.

So citizens, especially public servants, have to be worried about what we can afford to match them with. That is the purpose of much of this discussion.

The fact they have a lot more submarines than we have does not particularly bother me. It is more the fact of how very many more they are continuing to build. (D)

Regardless of your ability as a technician or your courage, when you get into things that approximate such a one-sided ratio, you have got some pretty good odds to argue about. (D)

At a time when the Russians did not have the hydrogen bomb, or the nuclear capability they have now developed with their long-range bombers, and did not have anything like the submarine fleet they have now, they nevertheless attacked us in Korea, and later in Indochina, and they are growing stronger all the time.

What we are trying to do is get full information and opinion about fields of military effort, especially airpower. The submarine picture and the airpower picture are inextricably bound together, in my opinion, just like foreign policy is bound up with military policy.

I would like to go back to one of my favorite subjects, the great potentialities of the seaplane, and ask a couple of questions, Admiral, before we recess.

Many I had in mind Admiral Russell answered for Senator Jackson.

SATISFIED WITH SMALL NUMBER OF SEAPLANES PLANNED

Are you satisfied with the number of seaplanes that are on order, or would you prefer to have more?

Admiral COMBS. I am satisfied with the number we have on order, sir. That carries out my feeling that we have got plenty of seaplanes coming along to try out our methods with.

We have more in the future that we propose to ask for, and I believe, as far as the seaplane goes, this particular model of seaplane, that we are getting them at as good a rate as we can use them.

Senator SYMINGTON. You say you have. You funded for a few additional seaplanes for 1956 and asked for more in 1957. But you do not know whether you are going to get them, or do you know? (D)

Admiral COMBS. We feel that we are going to get them, yes, sir.

Senator SYMINGTON. Have you been told so?

Admiral COMBS. Well——

Admiral RUSSELL. They are scheduled, and there is every reason to believe we should get them. Our program indicates——

Admiral COMBS. Are you referring to——

Senator SYMINGTON. The relatively small number of production P6M's placed on the procurement list. (D)

Admiral COMBS. You are speaking of the ability of the company to make them, or the Congress to give us the money?

Senator SYMINGTON. Right; that is what I am speaking of, the last.

Admiral COMBS. Our appropriation bill, I believe, has passed the House, and it was just argued before the Senate on Monday.

Senator SYMINGTON. In other words, you recommended it.

Admiral COMBS. Yes, sir.

Senator SYMINGTON. I am fairly sure you will get it if you recommended it. (D)

LOSS OF SEAPLANE

Senator SYMINGTON. What was that crash on this seaplane? Did they work out why that plane crashed?

Admiral COMBS. I would like to have Admiral Russell speak to that, sir, the Chief of the Bureau of Aeronautics.

Senator SYMINGTON. Yes, sir.

Admiral RUSSELL. The airplane was lost due to a sudden malfunction of the horizontal tail surface.

Do we have a picture of the P6M?

Never mind. Leave the lights on.

Senator SYMINGTON. It was something that was found out about, and can be corrected, and you can go ahead with the ship?

Admiral RUSSELL. That is correct, sir; yes, sir.

Very briefly, the horizontal tail, which is completely hydraulic-controlled, went full up, suddenly, and the airplane broke up by doing the beginning of an outside loop. The engines came out about nine times the force of gravity, and went straight ahead. The wings bent completely down, and the underside touched the fuselage, and we think then they broke by clapping underneath the airplane.

But it was due to the sudden swing upward of the horizontal tail, sir. Something went wrong in the hydraulic control or something else in the control system.

Admiral COMBS. May I say a word on that, sir. The operation of picking up all of those pieces from the Chesapeake Bay down there, laying them out on the deck of the hangar and then determining what caused this, was a great job.

I think a great deal of credit goes to Martin and to the Bureau of Aeronautics for figuring this crash out as well as they did.

ANTICIPATED SEAPLANE USES

Senator SYMINGTON. At one point here you said that in order to meet our requirement for mining aircraft, it is currently anticipated that additional P6M's would be included in the fiscal year 1958 program.

You are not limiting in any way the use of this seaplane for the performance of a mining operation; are you?

Admiral COMBS. No, sir.

Admiral RUSSELL. No, sir.

Senator SYMINGTON. Will that be an additional operation? (D)

Admiral COMBS. They will be configured—it is a unique airplane in the way it is configured to carry these stores. It can deliver mines, it can deliver bombs, it can deliver anything up to the weight of 30,000 pounds that it is supposed to carry. (D)

Senator SYMINGTON. Now, Mr. Counsel, have you any questions?

Mr. HAMILTON. You do not have these P6M's operational at this time; do you?

Admiral COMBS. No, sir; but we expect to have a small number phasing in during the next few years.

Mr. HAMILTON. Some of that number will be deployed overseas and some will be here on a rotation basis; is that correct?

Admiral COMBS. Yes, sir.

Mr. HAMILTON. Will these planes be operational at all times?

Admiral COMBS. We figure about 90 percent readiness at all times.

Mr. HAMILTON. Thank you.

Senator SYMINGTON. Senator Duff?

Senator DUFF. No questions.

Senator SYMINGTON. Well, Admiral, we are very grateful to you and these other gentlemen of your staff for your briefing today.

I think we are going to have some people coming in on the missile program, who have traveled a long way, for the Army, this afternoon.

Our counsel cannot be here the first part of next week. Therefore, we would like to have you back, if convenient, Wednesday morning.

Admiral COMBS. Yes, sir.

Senator SYMINGTON. This has been informative and instructive. Thank you very much.

(Whereupon, at 12:40 p. m., the subcommittee recessed, to reconvene at 2 p. m., of the same day.)

(Further testimony of Admiral Combs and other Navy witnesses will be printed in pt. XII of the airpower hearings.)

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